

Reproductive Assessment in Psittacine Birds

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Abstract: Veterinary reproductive evaluation, with endoscopic examination, is an important tool for aviculturists in evaluation of new breeding stock, as well as in evaluation of stock with poor reproductive performance. Biopsy of the gonads is a useful adjunct, especially in males, as biopsy of the testes can differentiate chronic orchitis with fibrosis, which can result in infertility from reversibly inactive testes. In this paper, we present observations and anecdotal impressions obtained through years of avicultural veterinary practice.

Introduction

Reproductive assessment is an important service that avian veterinarians can provide to aviculturists. Aviculturists should use these services when purchasing new breeding stock for their collections (especially if birds are being sold as proven pairs), to evaluate pairs that have produced after 2 to 3 years in a proper avicultural set-up, and to evaluate birds with declining reproduction.¹

Ideally in assessment of a pair, both the male and the female should be examined. Aviculturists often mistakenly choose to examine only the male, for example, in the case of infertile eggs.

If possible, the veterinarian should be acquainted with the housing, husbandry, and diet of the pairs to assist in detecting husbandry deficits that may result in reproductive failure. Reproductive assessment should include obtaining as much history as possible about the pairs to aid in diagnosis and formulating recommendations.

Assessing Newly Purchased Pairs

Individual birds as well as pairs of birds are frequently offered for sale as breeding stock. Frequently they are offered as proven pairs. Pre- or post-purchase examination of such birds is a very important safeguard for the aviculturist. Ideally, finalization of the transaction should hinge on the veterinary exam. Culling of non-productive stock is a common means of enhancing avicultural productivity. Parrots can live and appear in very good condition for years after their reproductive potential has diminished. Pairs that are senescent or in declining production can honestly be sold as proven breeders, even though their future breeding success may be questionable.

Unscrupulous aviculturists often prey upon new or naive aviculturists by selling supposedly proven breeding birds that may turn out to be very old, or not even true pairs. To avoid the costs of reproductive exams, aviculturists often do their own diagnostics, checking gender by DNA analysis of blood or feathers. However, this type of evaluation provides only a small portion of the information that can be obtained by a veterinary reproductive exam.

Determination of age and origin is an important aspect of the history. Fortunately, many aviculturists band their chicks with closed leg bands that are marked with the year of hatching. Important history may be obtained from

evaluation of leg band information, possibly allowing one to trace the band to the breeder. Websites are available to assist in the search, such as Legbandnumbers@yahoogroups.com, or <http://buddysfriends.com/registry.html>. If the birds are captive bred and the band numbers are sequential, this may be an indication that they are siblings.

It is a common practice for veterinarians to remove closed bands from pet birds. These birds often end up in avicultural collections. If you remove a closed band, you remove the identity for a bird that may be very important in the future. If properly fitted, closed leg bands seldom cause entrapment injury.

Open bands can indicate that a parrot was wild-caught and imported. If the bird entered through a USDA-approved commercial quarantine station, the band will have 3 letters and 3 numbers (eg, FIX-333). Any birds with such a band would have been imported no later than 1993. The Wild Bird Conservation Act went into effect in late 1992 and allowed 1 more year of declining imports before they ceased. As a result, any parrot so banded would be at least 13 years old, unless it was banded with such a band after entry. In these band codes, the first letter indicated the state of entry (C and O being California, F being Florida, L being Louisiana, H being Hawaii, I being Illinois, M being Michigan, and N being New York). The second letter in the 3-letter code was an indication of the USDA-licensed quarantine station. Because California at one time had more than 24 licensed quarantine stations, the letter code "O" was added for California stations. The third letter in the code was a part of the number code, making it alphanumeric with 24,000 possible combinations before it repeated. To obtain more information on when a bird was imported, the USDA can be contacted and *might* be able to trace it. This is important because many wild-caught birds initially placed in breeding collections are now becoming aged. Many are resurfacing and being resold as their reproductive capability declines.

If no information as to age is available, the veterinarian can make an educated guess by looking at the face, eyes, feet, skeletal structure (posture, etc.) and by performing an endoscopic examination of the gonads. Thinning of skin (especially around the face and eyes), very scaly feet and deformed nails, arthritic feet or other joints, eye color changes, cataracts, slouching posture, and lateral rotation of the carpus can all be hints of advanced age. The plumage of parrots does not gray with age. Their plumage color remains brilliant if health and diet are adequate.

An endoscopic exam of newly purchased breeding stock is essential to detecting reproductive problems or assessing reproductive capability. It is also helpful in assessment of general health.

Veterinarians are often reluctant to make a prediction of reproductive viability unless sterility can be obviously demonstrated. Breeding readiness and gonadal activity is fluid and can change if husbandry deficiencies are corrected.

Assessing Non-producing Pairs or Pairs in Declining Production

Assessment of poorly producing pairs must include evaluation of husbandry, unless it is known to the veterinarian that the aviculturist is knowledgeable and experienced. Examine health and weight records, if available, for additional clues.

Some husbandry problems that might cause poor reproduction, or reproductive failure, include inadequate or inappropriate diet, caging, nest boxes, or perches; diets appropriate for pet birds but not stimulatory for breeding birds; and cyclic or flush feeding. Diets higher in protein and fat and special supplements may be indicated for birds in production.

Size, construction material, and placement of caging may influence reproduction.

Consider the effects of neighbors, traffic, and disturbances. Vermin can profoundly affect reproduction. Consider the effects of rodents, cats, dogs, raccoons, ants, mosquitoes, or other biting insects. Weather conditions may be contributory, especially if a large portion of the flock is not producing as expected. Sanitation, water quality, and food hygiene can also have a profound effect on flock health and production. Nest boxes should be appropriate size and construction for the species. Nest material should be dry, of adequate quality and depth, and clean. Birds that soil their nest boxes tend to have relatively poor reproductive potential. Excessive heat in nest boxes, or boxes which leak or are too moist, can be a major problem. Perching must be adequate in size, types, stability, and placement for successful copulation.

Compatibility of the pair should be evaluated. Mate aggression is a major problem in some species. Male aggression toward females is well known in cockatoos and Amazons. But female aggression directed toward the male can also be a problem in Eclectus parrots, Buffons macaws, and many Asian parakeet species.

Endoscopic examination can assist in detection of unrecognized stressful conditions by evaluation of the adrenal gland (S. C., unpublished data, 2006). Some pairs simply don't like each other. Pairs in which the birds are always sitting at opposite sides of the cage are unlikely to have good production. If the heads are not preened this is another sign of incompatibility. Ideally, the pair should sit together, enter or defend the nest box together, engage in allopreening, and eat together peacefully. If the pair approaches and attempts to attack the caretaker together, this is a good sign of a strong pair bond and good reproductive potential. Ask the aviculturist if the pair enters the nest box, "works" the nest, and in general appear to be compatible. Sometimes a bird might pair with a neighboring bird, or males in adjoining cages might spar, which can affect production.

Placement of the cage in the aviary, yard, or home may also have an impact if the birds are distracted, disturbed, agitated, too exposed, too enclosed or sheltered, too close to areas of high activity, too hot, etc. An extensive knowledge of the species involved is required to adequately evaluate many of these factors. Observation is also critical.

Detection of subclinical health problems can be revealed during the reproductive exam, but it is important to also look for problems that could specifically affect reproduction. Thorough examination under anesthesia may help to reveal oral problems such as papillomas, tumors, vitamin deficiencies, or infections. Keel scoring and recording of body weight can be important in determining if obesity or low body weight is a factor. Carefully examine feet and legs for signs of excessive wear or ulceration, constricted toe syndrome, arthritis of the feet or leg joints, overgrown nails, or other physical condition that may affect copulation.

Examination of the cloaca should include eversion to detect papillomas or other abnormalities of the cloaca and evaluation of fat pads that might preclude proper positioning for insemination. In a reproductively active female, the cloaca will be flaccid as hormonal stimulation readies the hen for laying.

Endoscopic Examination

Endoscopic evaluation should include evaluation of all organs, not just the gonads. Undiagnosed air sac disease, anthracosis, enlargement of the proventriculus, hepatic disease, renal disease, etc may impact reproduction. If the endoscopy site is lateral, behind or between the last ribs, soft ribs, indicating calcium deficiency can be detected.

Endoscopic evaluation of the female should include recording of descriptions or rating of the size of the stroma of the ovary, the size and relative number of follicles, the presence of ovarian cysts, the relative accumulation of

caseous material, or scarring at ovulatory sites. The oviduct should be evaluated for level of hypertrophy or activity. The distal pole of the ovary where the fimbrium of the oviduct is located should be evaluated for any possible blockage. The adrenal gland is usually not visible in a mature female parrot. If it can be visualized, this may be an indication of an undersized or inactive ovary or excessive stress resulting in adrenal enlargement and possibly reproductive suppression. Finding of a thickened membrane overlying the ovary may indicate inflammatory disease. Finding of a very small stroma or presence of excessive amount of white scar tissue may indicate senescence. Interestingly, older female parrots may have low fertility, or low viability of ova, yet still successfully produce eggs. In fact, many older females, especially macaws, will produce larger number of eggs than young females, and still have a low rate of fertility despite being paired with a fertile male.

If a female is very near to laying, visualization and evaluation of the ovaries is very difficult if not impossible. Enlargement of the oviduct displaces organs and large follicles ready to ovulate may be easily damaged. Endoscopically, these hens will look very abnormal, possibly ill. If the bird has an enlarged abdomen and flaccid vent, any further diagnostics should be delayed until she is given the opportunity to lay.

Biopsy of suspicious tissue may be helpful; however, biopsy does not seem as helpful in evaluation of females as in males. Some potentially useful findings include the presence of inflammation or fibrosis of the gonad. For example, the presence of fibrosis suggests replacement of functional gonadal tissue. Excessive fibrosis will render the animal infertile.²⁻³

Ovarian or oviduct infection is a common cause of infertility, embryonic mortality, and weak, sick chicks at hatch. The easiest way to diagnose oviduct infection is to culture eggs. To introduce a swab into the orifice of the oviduct is very difficult and potentially harmful. Hens that are laying large numbers of eggs seem to be predisposed to ascending oviduct infections.

Endoscopic evaluation of the male should include recording of the relative size, color, density, and shape of the testes. The relative size of the adrenal gland (does it appear enlarged?) and a ratio of size of the adrenal to the testes should be recorded. For example, if the adrenal gland is the same size as the testicle, this would be a 1:1 ratio. Unless the bird is very young, this would not be a favorable finding; indicating that either the adrenal gland is enlarged or the testes are very small. Depending on the species and time of year, a good male may have a ratio of 1:3 or more. If the testes are very active (again depending on the species), the adrenal gland is not visible at all, and the ratio may be 1:6. The adrenal:testicular ratio is very useful in comparing males within a collection to determine which is most active (S. C., unpublished data, 2006).

The surface of the testes should be evaluated for smoothness and degree of vascularization. Wart-like structures on the surface may be dilations of the seminal vesicles that may or may not affect reproduction. The epididymus should be examined, if visible. The vas deferens should be examined for possible blockage. Thickened, proliferative, or excessive membranes surrounding the testes may be an indication of air sac infection or inflammatory disease that may affect the testes.

Enlargement of the adrenal gland and a high adrenal:testicular ratio can indicate excessive stress and suppression of reproductive performance by endogenous glucocorticoids. This is a common finding in non-productive males. The density of the testes can be an indication of fibrosis. A mature and active testicle should not only be enlarged but also have a translucent, almost fluid-filled appearance. A highly vascularized testicle, or a testicle in which the tissue appears pink or red, can be a sign of orchitis. Orchitis appears to be a common cause of male infertility in psittacine birds.

A mature and active testicle *should not* be biopsied. Such a testicle could explode or leak, releasing spermatozoa into the body cavity. If the testes appear small and inactive, especially if it appears very dense (indicating fibrosis), or very inflamed, biopsy may be indicated to document whether the testicle is simply inactive with reversible fertility or fibrotic and irreversibly infertile.

If on physical and endoscopic exam the female is found to be in good reproductive condition, yet the aviculturist reports finding no eggs, the pair may be eating eggs. This is especially common with captive-bred parrots. Aviculturists often report finding no evidence of egg eating (no shell fragments in the nest box); however, this does not eliminate the possibility of egg eating. By closely monitoring the cycle of each hen and checking the nest box in the early morning and late afternoon, the aviculturist may be able to collect eggs before they are eaten.

Conclusion

A veterinary exam including endoscopy can provide insight into psittacine reproductive failure. When coupled with assessment of husbandry, age, and other important factors, the veterinarian can assist the aviculturist in diagnosis of reproductive failure. Repair of birds, careful observation of pairs that eat eggs, and correction of husbandry deficiencies can enhance production.

References

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