

Pathological Reasons for Plucking
15th Annual Mardi Gras Avicultural Conference
February 15, 2004

Drury Reavill, DVM, ABVP, certified in avian practice, Diplomate, ACVP
Zoo/Exotic Pathology Service
2825 KOVR Drive
West Sacramento, CA 95605
(916) 725-5100
Dreavill@zooexotic.com
www.zooexotic.com

Feather picking is not a diagnosis, it is a sign of disease. It is defined as the plucking of feathers or the mutilation of feathers by the bird. The typical appearance is of normal feathering on head, with areas of feather loss or mutilation elsewhere on body. Unfortunately even the classic feather picking birds due to abnormal behavior may not look like this and some cases of feather picking that are caused by actual disease may present this way.

It is important to thoroughly rule-out any underlying disease conditions in a feather picker. In general, the longer a bird has been feather picking, the more difficult it will be to stop the process, even if the inciting cause is discovered. Some disease conditions are contagious to other birds and some may suggest a need to improve basic husbandry conditions or nutrition. Once an abnormality is identified, treatment is recommended. Just the simple loss of feathers can be a significant drain on maintaining body condition and this may affect important functions (for the aviculturist) such as producing more chicks. There is an increased nutritional demand, especially for the amino acids cystine (methionine), lysine, and arginine, with feather loss from disease or plucking. The energy intake by defeathered birds is about 85% higher than normal feathered birds (at 22°C). There is also increased heat loss. This can result in an increased metabolic rate up to 60%.

The basic diagnostic tools include, signalment, patient history (environment, nutrition, clinical signs), physical examination, and a minimum database of laboratory tests. The

type of bird, age and sex (the signalment) will make a difference in how we approach feather picking and the prognosis. In one study, feather picking Amazons and cockatiels were most likely to respond to treatment of any identified abnormal laboratory results than other species. For cockatiels, treatment of giardia infestations and bacterial infections usually resulted in resolution of feather and skin problems. It was suspected there was an underlying nutritional or metabolic disorder in many of these birds. Feather picking conures and eclectus appear refractory either due to an inability to treat adequately or from the inability to identify a disease cause and provide an effective treatment.

There are many diseases and many diagnostic tests that should be considered when working up these birds. A good baseline of tests is helpful and provides a starting point for further testing if needed, as well as something that can be compared with as the treatments or skin disease progresses. Table 1 lists the common tests. It is important to work through the testing procedures with your veterinarian. Not all tests are appropriate for an individual bird and rarely will any one test get you a diagnosis for why the bird is feather picking.

Table 1

Minimum database

- Complete blood count
- Blood chemistry panel
- Choanal and cloacal bacterial gram stains
- Fecal flotation and direct smear (for parasites)

Additional Diagnostic information

- Choanal and cloacal cytology
- Choanal and cloacal bacterial/fungal cultures
- Whole body radiographs
- Feather and skin biopsy

Miscellaneous diagnostic information

- Fecal acid fast stains
- Giardia fecal stains
- PBFD (Psittacine Beak & Feather Disease Virus) DNA probe
- Polyomavirus DNA probe
- Thyroid function tests
- Bile acids

Serum electrophoresis
Chlamydiophila titers
Endoscopy
Heavy metal assays

General Therapy

- 1) Correct any nutritional deficiencies.
- 2) Remove bird from any exposure to aerosolized toxins or contact toxins which may prove irritating (cigarette smoke, perfumes, hair sprays, cooking oils, wood stoves, kerosene fumes, disinfectants).
- 3) Improve general husbandry with frequent exposure to unfiltered sunlight or full-spectrum lighting and start a regular misting or bathing with PLAIN water to encourage normal preening and to clean the skin and feathers.
- 4) Identify and change any behavioral abnormalities contributing to the feather picking.
- 5) DO NOT apply oils to the feathers or skin (not an absolute rule, however, you should know what you are trying to achieve and be able to restrict the bird's ability to spread the oil or ingest it).

The Diseases

General poor feather condition

Ragged and broken feathers can occur with trauma, incompatibility of cage mates, delayed molt, malnutrition, some external parasitic infestations, and feather chewing/picking. Malnutrition can cause a partial molt of shorter duration than normal. An inability to preen as a result of illness, spinal deformities, or beak malformations can result in numerous feathers with retained keratin sheaths. Stress bars, which can weaken the feather structure are associated with the release of corticosterone hormone during a stressful event, which causes a dysfunctional growth at the epidermal collar in the developing feather. This is a frequent occurrence in hand-raised psittacines.

Abnormal feather colors

A lack of normal pigment (achromatosis) in cockatiels was experimentally induced with choline and riboflavin deficiencies. A dark depigmentation of the contours in psittacines is associated with a delayed molt and structural changes of the aging feathers. Liver disease can be associated with delayed molts, as can any chronic illness. Chronic low-

grade lead toxicity has been suspected to cause graying of cockatoo feathers. African grey parrots develop light brown feathers with general malnutrition. In cases of feather color change without feather molting, it is speculated that the color is produced by a change in the lipids of the keratinocytes. If it is true that excessive biliverdin (a liver bile acid pigment) is excreted by the keratinocytes, then the rapid development of yellowing in cockatiels with liver disease maybe a result of this process.

Inherited Disorders

Feather duster disease (chrysanthemum disease) of budgerigars is a lethal recessive genetic disorder. These birds have continued growth of flight, tail, and contour feathers. They are unable to fly and make barely audible noise.

Feather follicle cysts are a heritable condition in canaries, especially those with complex feathering such as the Norwich or Gloucester strains. These birds are genetically selected to produce an extra down-type feather (soft feathering) and that appears to predispose them to cyst formation. The pectoral and scapular feather tracts are a frequent site of multiple cysts, usually involving the entire tract. The cysts appear as hard, yellow nodules from the trapped feathers that are curling on themselves. If traumatized, they may become secondarily infected. Trauma to the follicle, such as from overpreening, injury from cage confinement, or improper removal of a bleeding feather stub, can also produce a feather cyst. These have been described in macaws, mynahs, and Amazons. They are usually found on the primary or secondary remiges. Treatment can include careful manual expression of the cyst contents or surgical removal of the entire follicle.

The baldness at the crown of the head, caudal to the crest feathers in lutino cockatiels, is a heritable trait. This trait must be differentiated from feather picking of the head feathers by a more dominant cage mate.

Trauma

Tail trauma

Avulsion of the skin and muscles from their attachments on the ventral tail base appears as a split on the ventral surface, just caudal to the vent. Cockatiels (*Nymphicus hollandicus*) appear to be more prone to traumatic tail avulsions although cases have occurred in conures (*Aratinga species*), cockatoos (*Cacatua species*), and African grey parrots (*Psittacus erithacus*). The lesion is common in recently wing clipped fledglings

that attempt to fly and is probably due to an uncontrolled tail landing. It may be misdiagnosed as a cloacal prolapse and these birds will chew at the wound site.

Blood feathers

The newly emerging primary feathers of the wings or tail are susceptible to trauma when bumped or damaged. This is a common injury and as bleeding may be extensive, it should be treated as an emergency. Repeated damage to the feather and feather follicle can lead to abnormal feather regrowth and possible feather cyst formation. This type of trauma especially if repeated suggests a review of the environment for something that is disturbing the bird.

Automutilation of sternum in psittacine birds (split sternum)

Split sternum generally occurs over the cranial portion of the sternum, along the point of the keel and may appear as an open wound of the skin and muscle. Continued self trauma can lead to tissue necrosis and infection, which can extend into the deeper muscles and bone of the keel. A mixed bacterial population (*Streptococcus species*, *Staphylococcus aureus*, *E. coli*, *Pseudomonas species*, and *Klebsiella species*) and occasionally fungi can be isolated from these wounds. The pruritis typical of these lesions may be due to the secondary infections. Improper wing trims in heavy bodied birds (African grey parrots and mealy Amazons, *Amazona farinosa*) resulting in traumatic landing on the sternum is suspected to be one cause. In flighted birds the reason for self mutilation is unknown.

Parasites

In general, parasitic infections are uncommon in well-maintained pet birds. However, it is important not to miss these as they can and should be treated!

Mites

Knemidokoptic mange (scaly face and leg).

The poultry mite is *Knemidokoptes mutans* and *K pilae* is found on budgerigars (*Melopsittacus undulatus*) and Canaries (*Serinus canarius*). Knemidokoptic mange has also been reported in Gouldian finches (*Chloebia gouldiae*), cockatiels, Amazons, ring neck parakeets (*Psittacula species*), scarlet chested parrots (*Neophema splendida*), princess parrots (*Polytelis alexandrae*), and yellow fronted kakariki (*Cyanoramphus auriceps*).

Lesions are found on unfeathered skin around the beak, cere, vent, legs, and feet. In severe infestations, feathered portions of the skin may be involved. The lesions are raised yellowish, honey combed encrustations. With chronic infections, the beak and nails may become deformed. Knemidokoptic scaly leg of canaries and mynahs must be differentiated from vitamin A deficiency.

The mites are transmitted directly from bird to bird, although primary transmission may occur in the nest to featherless offspring. Infestations in budgerigars can be asymptomatic for over a year. Severe infestations have been described in birds with PBFDV (psittacine circovirus) and mycobacterium infections and may be related to a lapse in immune function such as with demodex infection of dogs.

Diagnosis:

The mites are generally abundant and are readily identified on skin scrapings.

Dermanyssid and Macronyssid mites (red mite):

These external parasites are of occasional clinical significance. They have been reported on canaries and rarely on budgerigars. The mites feed nocturnally and spend the day off the host. Clinical signs include restlessness at night and anemia.

Diagnosis:

Examining the inner surface of a white cloth cage cover left on overnight can make the diagnosis. The mites will be red due to the ingestion of blood.

Myialges (Metamicrolichus) nudus:

This mange mite feeds on the skin surface, forming pits or burrows and occasionally parasitizing feather bulbs. Affected birds generally present with pruritic dermatitis and feather loss on the head, the skin is flakey, scabby, and reddened. Infestations are more common in grey cheeked parakeets (*Brotogeris pyrrhopterus*) than other species. The life cycle requires a transport host (lice or hippoboscid flies) to carry the eggs to a new host.

Diagnosis:

Identifying mites on a skin scraping can make the diagnosis.

Quill mites:

Several families of this group of mites have been described within the quills of passerine and psittacine birds. The feathers may appear abnormal with a thickened, easily split calamus. These parasites live and reproduce within the quills, feeding on the tissues of the quills and not on blood.

Diagnosis:

The mites can be found in the powdery quill material of abnormal or broken feathers.

Lice

The biting lice *Neopsittaconirmus*, *Psittaconirmus*, *Eomenopon*, and *Pacifimenopon* have all been reported on psittacine birds. Infestations are common on domestic gallinaceous birds, pigeons (*Columba livia domestica*), and wild birds but are rare on the typical pet bird. The clinical signs of a louse infestation are a mild to moderate pruritus, mild flakiness, and minimal to moderate feather damage. Lice are host specific and do not survive long in the environment. Studies have shown that rock doves with damaged feathers from louse infestations had reduced winter survival and attractiveness of males to females.

Diagnosis:

The lice and eggs can be seen on primary and secondary flight feathers or on feathers around the vent.

Giardia

Giardiasis has been linked to the cockatiel feather mutilation syndrome. Although most infections are asymptomatic, some birds exhibit an intense pruritus especially of the axillary areas. The proposed mechanism of pruritis is related to gastrointestinal malabsorption of fat soluble vitamins.

Diagnosis:

The trophozoites or cysts can be identified with direct fecal saline smear.

Mycotic Diseases

Fungal skin diseases are not common in pet birds and there is little information in the literature. The mere isolation of a fungal organism from a specimen is not to be

considered diagnostic for the cause of the lesion because many fungi are found on feathers and skin of healthy birds and heavy fungal growth may occur on old and soiled feathers without causing disease. Repeated isolation of the fungus and histopathologic examination of supporting lesions may lead to a definitive diagnosis.

Fungal organisms associated with skin or feather disease in the companion bird include *Trichophyton species*, *Microsporum gypseum*, *Aspergillus species*, *Mucor species*, *Rhizopus arrhizus*, *Penicillium species*, *Cryptococcus neoformans*, *Malassezia species*, and *Candida species*.

Beak lesions

Fungal infections of the beak are generally chronic infections, sometimes present for years and appearing refractory to therapy. Penicillium and Aspergillus fungi are common isolates. The beak may have extensive areas of necrosis or an asymmetrical distortion. There is generally an underlying lesion, such as squamous cell carcinoma, poor husbandry, or beak fractures.

Diagnosis:

The diagnosis can be made on cytology by scraping the affected area with a scalpel and finding fungal hyphae, conidia or yeast. An excisional biopsy and radiographs are recommended to evaluate for underlying diseases.

Candida

Lesions associated with candida in parrots have involved the commissures of the mouth, the epidermis around the nares, and occasionally feather follicles on the head, back, and ventrum. The infections will produce white crusty to scaly material and feather loss. This infection is typically secondary to underlying diseases so these should be considered.

Diagnosis:

Exfoliative cytology, fungal cultures, and biopsy samples are recommended. Systemic evaluation and review of the husbandry practices may be necessary to direct an appropriate therapy.

Dermatophytes

Dermatophytosis has a worldwide, but sporadic occurrence in birds. The primary organisms are *Microsporium gallinae*, *M gypseum*, *Trichophyton mentagrophytes*, *T megnini*, and *T verrucosum*. Scaly skin encrustations and patchy loss of feathers on the head, neck, and breast have been described in waterfowl, galliforms, passerines, pigeons, and psittacine birds. There was a reported case of *Microsporium gypseum* causing feather loss on the head, neck, and breast in a budgerigar. *M gypseum* was also cultured from a lesion on the owner's hand. Both *Microsporium* and *Trichophyton species* have also been isolated from cases of folliculitis, which appear as a gross swelling of follicles with variable scaliness and crust formation.

Diagnosis:

Histologic examination is important, as culturing the organism will not definitively link it to the lesions.

Malassezia

Malassezia dermatitis and follicular hyperkeratosis is recognized in a number of psittacine and several passerine bird species. Grossly there may be thickening and flaking of the skin with variable feather loss. However, these are superficial infections that in many cases do not elicit inflammation. The yeast organism, which in a recent case has been identified as *Malassezia slooffiae*, can be found in the superficial epithelial and follicular keratin.

Diagnosis:

The diagnosis is made by histopathology of the skin and feathers. On exfoliative cytology characteristic 'foot print' shaped yeast organisms will be found.

Cryptococcus

The most common presentation of Cryptococcus is as a neurologic or respiratory infection. *Cryptococcus neoformans* can also produce granulomatous lesions on the face, beak, and sinuses with a variable inflammatory response.

Diagnosis:

Both cytologic and histologic examinations can readily identify the characteristic thick capsule surrounding budding yeast.

Bacterial Diseases

Bacterial infections may be either primary or secondary. Bacterial skin disease in pet birds may be confined to the feather follicle, develop into dermal abscesses/granulomas, or become generalized.

Staphylococcus species is the most common bacteria associated with folliculitis. Rarely, gram negative bacteria such as *Aeromonas hydrophila* have also been isolated. Grossly there may be swelling and reddening of the perifollicular skin.

Dermal abscesses appear as skin masses that may be ulcerated. Several bacteria including *Nocardia species*, *Serratia marcescens*, and *E. coli* have been reported to cause these lesions.

Generalized bacterial dermatitis (pyoderma) appears as focally extensive soft tissue swelling with discolored, pale, and flaking skin. Lesions may be pruritic leading to self trauma that results in a more severe lesion. Reddening, induration, and crust formation are typical. The most common isolate in psittacine birds is *Staphylococcus aureus* and most staphylococcal infections develop from endogenous flora. Pseudomonas infection may also occur and most often presents as a cellulitis. Breaks in the normal defense barriers or a severely compromised immune system may permit infection.

Most secondary bacterial dermatitis is the result of skin trauma. Generally there will be swelling, necrosis, and the development of a yellow, caseous exudate at the site of injury. Organisms may be difficult to identify and diagnosis will rely on histopathology and culture results.

Mycobacterium infections of the skin can appear as wart-like or dry, flaky swellings of the skin or raised ulcers (mainly on the head). These infections are generally associated with weight loss and other systemic signs. The dermal granulomas will resemble abscesses caused by other bacteria or fungi. Because of the zoonotic nature of the disease, an aggressive diagnostic approach is recommended. Biopsy and histopathology or acid fast stain of exfoliative cytology can yield rapid results.

Viral

Papillomavirus

Dermal papilloma is a virally induced disease of the unfeathered skin of the face and feet. These look like warty growths on the skin. Skin papillomas are more common on African greys (*Psittacus erithacus*), on the legs of European chaffinches (*Fringilla coelebs*) and Brambling's (*Fringilla montifringilla*) finches and at the commissure of the beak and on the head in canaries. These skin lesions look like poxvirus and knemidokoptes mites. A treatment has not been described.

Diagnosis:

Biopsy and histologic examination.

Polyomavirus (Budgerigar Fledgling disease)

This virus can infect all psittacine birds; however, the cutaneous lesions are most frequent in budgerigars. In budgerigars the clinical signs include increased chick mortality, abnormal feathering, and ascites (in seven to fifteen day old chicks). Slow development of tail and wing feathers (runners) may occur in less severely affected chicks. In these chicks, the primary wing feathers and tail feathers are either entirely absent or have thick sheaths with hemorrhage inside the shafts. Feather changes are rare in larger psittacine birds, however polyomavirus can produce subcutaneous hemorrhages, hemorrhage within the shaft of affected feathers, and reduced formation of down and contour feathers.

Diagnosis:

Biopsy and histologic examination and a PCR viral probe is available for diagnosis. There is a vaccine.

Poxvirus

Nearly every bird family or group has its own poxvirus that produce the typical skin and/or mucosa lesions. Agapornis (lovebird) pox produces lesions in the oral and nasal cavities, and on the skin of the eyelids, axillae, shoulders, and/or abdomen. These lesions are dark, discolored areas of skin, and when secondary bacterial infections exist, are very pruritic.

Amazona (neotropical) pox enjoys a wide host range in South American psittacine birds. Historically, this disease was a major problem in wild caught blue fronted Amazons (*Amazona aestiva aestiva*) and pionus nestlings held in quarantine. These birds would

be infected with the virus prior to capture and the use of common feeding instruments between birds would result in its dissemination. The disease may present in either the dry (cutaneous) or wet (diphtheroid) forms. The cutaneous form involves the non feathered areas of skin with development of papules or raised scab like lesions around eyes, beak, nares, tibiotarsus, and feet. Lesions will eventually desquamate, usually without leaving a scar. The wet form affects the mucous membranes and generally results in a high mortality rate. The associated lesion is a depigmented, raised plaque covered by a diphtheritic membrane and appears on conjunctiva, oral membranes, tracheal mucosa, and within bronchi.

Sturnidae pox affects mynahs and starlings, causing scab like lesions around the beak, on eyelids, and over the head. Pox viral infections in finches and canaries may produce lesions on the feet and legs, in oral the cavity, and in the upper respiratory tract. Early in a flock outbreak the initial cases die of a fulminating pneumonia. Later the typical cutaneous manifestations of proliferative papules, pustules, and nodules appear. These lesions may ulcerate and then crust over. The poxvirus of doves and pigeons also results in proliferative skin lesions that are commonly mistaken for neoplastic masses.

Transmission for all the poxviruses is by fomites or arthropod vectors, as well as direct transmission. The virus can remain viable for sixteen to nineteen days within mosquito salivary glands. A vaccine is available for some species.

Diagnosis

The diagnosis is usually based on histopathology of the affected tissues. Epithelial cells are hyperplastic and hypertrophic with large eosinophilic intracytoplasmic inclusions.

Psittacine beak and feather disease virus (circovirus)

There are two clinical presentations of this viral disease. In the chronic form, dystrophic feathers progressively replace normal feathers. Dystrophic feathers have retained sheaths and blood supply, clubbed appearance, stress lines, annular constrictions at the base of the feather shaft, and abnormal shapes. Beak lesions, which are more common in sulfur crested (*Cacatua galerita galerita*), umbrella (*Cacatua alba*), and Moluccan cockatoos (*Cacatua moluccensis*), include palatine necrosis, ulceration, elongation, and easily fractured beaks.

The most severe feather abnormalities occur in nestlings with the acute form. Feather necrosis and accompanying intra pulp hemorrhage are the major clinical signs. The birds of Australia, Indonesia, and Africa are most frequently affected. Currently, PBFVDV is seen in lovebirds (*Agapornis species*), budgerigars, lorries, lorikeets, cockatoos, Eclectus, and African gray parrots.

Feather lesions in lovebirds and African greys are rarely as florid as those seen in cockatoos and Eclectus. Many affected lovebirds show only dull plumage, or have an increased number or broken or worn feathers. Advanced cases may show some feather dysplasia or new feathers may simply not develop, leaving portions of the bird bald. A significant percentage, perhaps the majority of lovebirds infected with PBFVDV show no signs of disease at all.

A variant of the originally sequenced PBFVDV appears to be widespread in lorries and lorikeets in North American collections. Birds with this infection often do not show signs of disease, but a small percentage develop characteristic feather lesions. The viral disease has also been described in neotropical psittacine birds, pigeons, and finches. These affected birds may also present with feather dystrophy.

Diagnosis:

The diagnosis can be made through histologic examination of an affected feather or with a commercially available DNA probe.

Undetermined Etiologic Disease

Polyfolliculitis syndrome

Polyfolliculitis is a chronic condition that results in multiple small feather cysts in lovebirds, budgerigars, parrotlets, and cockatiels. Lesions are commonly located around the base of the tail, rump, and mid to upper neck. Clinical appearance is of more than one quill projecting from a feather follicle. A definitive cause has yet to be determined, although diseases that affect feather development should be considered (i.e. trauma or viral infections). In lovebirds, the lesion is suspected to be virally induced.

Diagnosis:

The gross appearance can be diagnostic, although surgical excision and histologic evaluation are recommended.

Perivascular Dermatitis

Allergic skin disease in birds is occasionally reported, but is not well documented, and confirmation can be difficult. Gross changes that may be associated with allergic skin disease include feather loss, reddening of the skin, and occasionally surface exudates. Some of the gross lesions may be secondary to self-trauma. As yet, there are still an insufficient number of cases with follow-up information to better define this disease.

Diagnosis:

It is important to rule-out underlying diseases. Examination of several skin biopsies and response to therapy provide the best diagnostic information.

Psychogenic Self-mutilation

This aberrant behavior is the commonly believed cause for many feather picking birds. It is attributed to a number of contributing factors including boredom, loss of a mate (human or feathered), change in diet, environmental maladaptation, exposure to cigarette smoke or intolerance to new stimuli. This condition looks like perivascular dermatitis with missing and frayed feathers, reddened skin, ulcers, and pruritis.

Diagnosis:

It is important to rule-out underlying diseases. Examination of several skin biopsies from both affected and unaffected areas.

Diseases of the Feet and Legs

Amazon foot skin necrosis

This is a syndrome of foot skin erythema and necrosis with auto mutilation seen primarily in the yellow naped Amazon parrot (*Amazona ochrocephala*). It has been described in birds of all ages. The clinical lesions appear as an irregular pattern of erythema with brown to black discoloration on the unfeathered skin of the legs and feet. Birds typically act very pruritic and will attack the affected area. No specific etiologic agent has been identified and treatment consists of preventing further mutilation while permitting the lesions to heal. Some birds have recurring episodes.

Diagnosis:

The gross appearance can be diagnostic, although surgical excision and histologic evaluation are recommended to identify possible etiologies and secondary disease processes.

Cutaneous Herpes

Clinically herpes lesions can resemble dermal papillomas. They are warty or plaque-like areas of skin thickening and horny layer proliferation. Lesions occur on the foot, toes, and less frequently on the shank of the legs of macaws (*Ara species*) and cockatoos. In cockatoos, nodules are proliferative and may be solitary or multiple. The lesion in macaws is typically a roughening of the skin and/or a flat, raised plaque. Depigmentation of the diseased tissue is common.

Electron microscopy of the lesions occasionally demonstrates viral particles suggestive of a cytomegalic herpesvirus. Mode of transmission is unknown, but is assumed to be by direct contact, however the virus does not appear to be highly contagious.

Diagnosis:

The gross appearance can be diagnostic, although surgical excision and histologic evaluation are recommended.

Gout Tophi

Articular or synovial gout will present as white swellings most commonly over joints of the feet and occasionally the wings. It is frequently recognized in budgerigars and cockatiels. The clinical signs include a shifting leg lameness, inability to bend the toes, and in some species, nonspecific feather picking. Therapy is only palliative. Surgical removal is not recommended because it is not possible to remove all the deposits and there is usually profuse bleeding.

Diagnosis:

Aspiration and exfoliative cytology is used to differentiate from granulomas.

Pododermatitis

Pododermatitis usually occurs secondarily to trauma with subsequent dermatitis and cellulitis leading to swelling and abscessation of the foot and toes. Birds of prey and waterfowl are highly prone to disease on the plantar surface of the feet (bumblefoot). The lesions may be due to improper perches for raptors and improper substrate for

waterfowl. Injury to one leg resulting in increased weight bearing on the other leg may also predispose to bumblefoot in some birds. Damaged skin becomes infected with *Staphylococcus aureus* that results in ulceration and infection of the underlying tissues. Secondary infections with *E. coli* are also common.

Improper perch size and texture is a common cause of lesions of the bottom of the feet of parrots. Flattened patches of skin characterize these lesions. Additionally, the roughened texture of the foot is lost and the skin becomes pink to red and smooth. Birds housed on perches that are too large will bear weight on their hocks and similar flat smooth skin lesions will develop on the ventral surface of the hocks. It is rare for the affected skin to become ulcerated.

Diseases of the Uropygial Gland

Infections and impactions of the uropygial gland result in an enlarged, reddened, and occasionally ulcerated gland. Infections may be due to bacterial or fungal diseases. Dietary deficiency of Vitamin A can block the ducts with exfoliated squamous epithelium secondary to squamous metaplasia. Impactions can be gently expressed, flushing the ducts can help remove blockages, and abscesses can be lanced. It is best to remove the gland before it progresses to a rupture, as rupture will result in extensive inflammation and fibrosis.

Diagnosis:

The diagnosis of uropygial gland disease includes cultures (bacterial and fungal), cytology, and biopsy.

Definitions

Arginine: one of the amino acids occurring among the hydrolysis products of protein.

Cellulitis: inflammation of connective tissue.

Cere: the cere is the thickened portion of skin that straddles the base of the nasal region. It may be feathered or bare and it may or may not contain the nares. Cockatiels have a well-developed cere compared to Amazon parrots.

Choana: the midline fissure in the palate of the oral cavity.

Choline: part of the vitamin B complex.

Cloaca: the common chamber that has openings from the digestive tract, urinary and reproductive tracts. It is divided into three parts the coprodeum, urodeum and proctodeum.

Commissure: the angle or corner of the eye or beak.

Conidia: plural of conidium. A nonsexual spore of certain fungi.

Contour feather: the contours include the flight and body feathers.

Cystine: an amino acid occurring in protein, notably keratin.

Dystrophic feathers: defective feathers.

Endogenous flora: bacteria and fungal organisms that are normally found within the host.

Epidermal collar: proliferating epidermal zone at base of a feather follicle. A common site to examine for evidence of PBFD virus (circovirus).

Erythema: redness of the skin, inflammation.

Follicle: invaginations of the skin that form feather follicles. No glands are associated with the follicles in birds.

Fomites: a substance, such as clothing or nets, capable of absorbing and transmitting disease organisms.

Gallinaceous birds: this order of birds include curassows, partridges, quails, pheasants, domestic fowl, peacocks, grouse, turkeys, and guineafowl.

Granulomatous inflammation: inflammation that is characterized by accumulation of macrophages. This is typically a chronic lesion.

Induration: the process of becoming extremely firm or hard.

Keratinocytes: keratin cells.

Lysine: an amino acid found in many proteins. It is an essential amino acid for birds.

Metabolic rate: generally this is the basal metabolic rate which is the amount of heat produced by energy released from tissues in an animal who is resting (not digesting, growing, or reproducing) and in a thermoneutral state.

Methionine: it is an essential amino acid for birds. Required for egg production and growth.

Naris (singular, nare; plural): nostril.

PCR: polymerase chain reaction technology is used to produce probes that hybridize with a wide variety of cellular genes and infectious agents (viruses, chlamydia) in tissue samples. It is a testing procedure.

Primary feathers: the primary feathers are attached to the carpometacarpus, major digit, and minor digit. Budgerigars have ten primary remiges (flight feathers) and Amazons, nine to eleven primary remiges.

Pruritis: itching.

Remiges: the flight feathers.

Riboflavin: one of the B vitamin complex that is a co-factor in many enzyme systems.

Trophozoites: the ameboid, asexual form of certain sporozoa parasites.

Recommended Reading

Bauck L. Avian dermatology. In: Altman RB, Clubb SL, Dorrestein GM, Quesenberry K, eds. *Avian Medicine and Surgery*. Philadelphia, PA: WB Saunders Company;1997:548-562.

Burgmann PM. Common psittacine dermatologic diseases. *Seminars Av & Ex Pet Med*. 1995;4(4):169-183.

Gill JH. Avian skin diseases. *Vet Clin North Am Exot Anim Pract*. 2001;4[2]:463-492.

Koski MA. Dermatologic diseases in psittacine birds: an investigational approach. *Semin Avian Exotic Pet Med*. 2002;11[3]:105-124.

Reavill DR. Avian Dermatology. 1997 Practitioner's Symposium. American Board of Veterinary Practitioners. Chicago IL, pp29-44.

Reavill DR. Inflammatory Skin Diseases. 2003 Avian Specialty Advanced Programs. 24th Annual Conference Association of Avian Veterinarians, Pittsburgh, PA, pp13-20.