CHAPTER

37

Management of Racing Pigeons

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Open flock management, which is used in racing pigeon medicine, assumes the individual pigeon is less important than the flock as a whole, even if that individual is monetarily very valuable. The goal when dealing with racing pigeons is to create an overall healthy flock composed of viable individuals. This maximizes performance and profit. Under ideal circumstances, problems are prevented and infectious diseases are controlled. In contrast, poultry and (parrot) aviculture medicine is based on the principles of the closed flock concept. With this concept, prevention of disease relies on testing, vaccinating and a strict quarantine protocol — measures that are not integral to racing pigeon management.

This difference is due to the very nature of the sport of pigeon racing; contact among different pigeon lofts (pigeon houses) constantly occurs. Every week during the racing season, pigeons travel — confined with thousands of other pigeons in special trucks — to the release site. Pigeons from different lofts are put together in baskets. Confused pigeons frequently enter a strange loft. In addition, training birds may come into contact with wild birds during daily flight sessions. Thus, there is no way to prevent exposure to contagious diseases within the population or to maintain a closed flock. The pigeon fancier also must be aware that once a disease is symptomatic, the contagious peak has often already occurred, so preventive treatment is too late. Treatment at this point may be limited to minimizing morbidity and mortality.

Fig 37.1a | The appearance of the head of a "modern" male racing pigeon, is a result of selective breeding. The differentiation of the sexes of the modern racing pigeon by head structure has become much less dependable than in the wild type.

Fig 37.1b | The head of an "old fashioned" or "show racer" male pigeon makes visual sexing easy.

What Makes a Loft Successful?

QUALITY OF THE PIGEONS

The health and racing abilities of racing pigeons are limited by the genetics of the parents. This selection process has even altered the appearance of the birds (Figs 37.1a,b). Using strong selection criteria when pigeons are paired ensures that the quality increases with each successive generation. Most pigeon fanciers select on the basis of performance and forget that other major factors to consider might include features such as resistance to diseases. For example, respiratory problems are common during the racing season, and it appears that heredity partially determines resistance. Thus, the veterinarian should play a role in establishing selection criteria.

It is critically important to understand that there is a difference in genetic susceptibility among different pigeons. Selecting pigeons that are not clinically affected by a disease outbreak helps increase disease resistance in the future. This is the principle of "survival of the fittest". During the first 10 weeks, 25 to 30% of the young birds should be culled. An average of an additional 60% will be culled or lost over the next 3 years.

CRITERIA FOR SELECTION OF BREEDERS

A winning racing pigeon is not necessarily the best choice for breeding. Similarly, the best breeding bird may not always have a good racing record.

Theoretically, the best performing racing pigeons are the result of cross-breedings. One chooses a bird from a certain line based on race performance and breeds it to a bird that is genetically predisposed to disease resistance. Offspring from such crossings are generally stronger and more viable but may not themselves make the best breeding pigeons (Figs 37.2a,b).

The quality of the breeding pigeon is determined by the achievements of its youngsters. There are several important qualities to select for in young birds. The birds should be visually healthy and strong and prove resistant to contagious diseases. Vigor, personality and intelligence are equally important. Birds should be creative in interacting with the rest of the flock, as successful cohabitation is required. Well-developed orientation skills are vitally important in gauging a pigeon's winning potential. Pigeons should be able to discern the most efficient route to return home without delay.

These criteria are applied at the earliest age, starting with eggs. Eggs that develop slowly and squabs that hatch late should be culled. The growth, development and feather quality are early characteristics that can be used to evaluate young pigeons. Physical abnormalities or delay in physical development are reasons to cull a bird.

Squabs should be able to fly by the age of 5 weeks. When youngsters start to fly around the loft, it is important to observe flight differences. The fancier should keep notes and compare observations among individual pigeons. Differences also can be noticed among youngsters during weaning. Ideally, a pigeon will find the water supply and start eating and drinking without any hesitation. It is not a good sign when a fledgling is slow to learn. Similarly, when it comes to finding a place to perch in the loft, which bird gets the most preferred spots? The ones that are chased away from the food source or ideal perches should be culled.

There will frequently be young pigeons that have a wet eye, a brown cere or abnormal feces. Even if these

Fig 37.2a | A typical breeding facility.

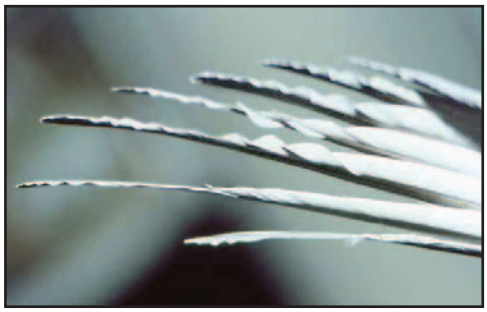

Fig 37.3 | Typical wavy or "milled " edges of primary wing feathers show a lack of condition.

Fig 37.2b | A female with youngsters.

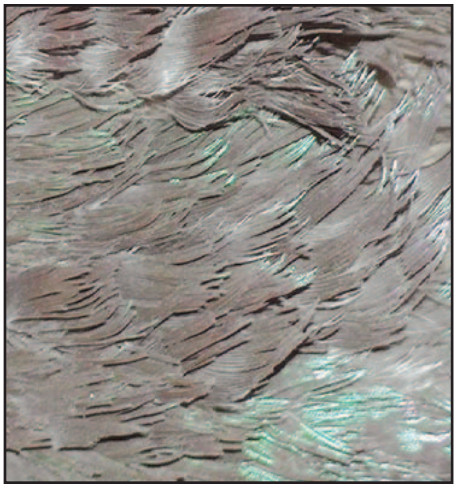

Fig 37.4 | Contour feathers are missing the proper structure to keep them smooth, and the normal shiny color has been lost. (Further examples showing lack of condition).

pigeons recover quickly, they should be culled. Culled birds should be recorded in the parents' records so improved matings can be undertaken in the future.

Criteria For Selection Of Birds To Race

The fancier's selection criteria for choosing birds to race often determines the success of his program. The author's current advice is to race a maximum of 50% of the available pigeons per race. When there is illness or other problems, racing a smaller percentage is advised. The decision to race an individual pigeon should be based on the condition of the bird, not on its previous performances. A decision so based can prevent the loss of good pigeons from over or misuse (Figs 37.3, 37.4). There are only a few very good pigeons. To race those pigeons in their prime is the goal, and this is more important than winning a particular race.

To judge the success of a selection program, the fancier should answer these questions: Is the percentage of the pigeons winning points in races increasing? Are there fewer disease problems, especially during the racing season? Are there fewer birds lost at the end of races? Has the profit increased?

If the answers are negative, then the pigeons may not be in the best physical condition (Fig 37.5). Birds that are under-conditioned not only perform poorly, they do not have enough resistance to infection during transport. Such birds commonly have subclinical problems, especially respiratory disease (see Respiratory Problems, below). An opportune time to evaluate pigeons is immediately after their return from a race. A bird's recovery speed and any problems seen immediately after a race should be documented.

FANCIER'S COMMITMENT TO QUALITY

Year after year, champions come from lofts where the owners are committed to selecting quality birds. Good fanciers plan the purchase of new pigeons based on characteristics that will improve the flock rather than

Fig 37.5 | A section of this feather's vane is defective following a molt, supporting the evaluation of lack of proper condition.

Fig 37.6 | A pigeon loft, displays adequate but not excessive amounts of glass.

purchasing a new bird that has won a certain race. Old breeding stock should be kept pure to conserve good qualities in case cross-breedings do not work out as planned. While infectious diseases are still present and do spread among most of the lofts during the racing season, this commitment to quality ensures that infectious diseases generally don't play a major role in ideal lofts. On the other hand, an outbreak of herpesvirus infection can be devastating to young pigeons under any situation.

Fanciers should be educated on establishing high quality standards in their loft as well as their birds. They then can base husbandry decisions on logic, not on what other fanciers tell them. For example, in the past, a fancier often made the decision to put more glass in the loft roof, because everyone was putting glass in their roofs. The increased level of light was perceived by many to be advantageous, especially in the early months of the year. However, many fanciers did not think about the disadvantages. More glass resulted in greater temperature fluctuations. The excess glass promoted excess humidity in cool months, while it led to the loft becoming too hot and dry in the summer.

THE LOFT

Climate in the Loft

The loft's climate should be warm, dry and without draft (Fig 37.6). The environment of the pigeon house must be constantly monitored because temperature and humidity fluctuate with changes in the weather, as well as between day and night. A common error during cold, wet weather is to allow too much ventilation, which leads to a house colder on the inside than out. Instead, ventilation should be reduced and supplemental heat added. At the beginning of the season, the loft temperature should be at least 12° to 13° C (53-55° F) during the night. The humidity should not be over 70%.

During warm, dry periods, many pigeon houses are insufficiently ventilated, becoming hot and dusty and creating respiratory signs that fail to respond to any medication. The temperature should not be over 28° C (82° F). Otherwise, pigeons will start drinking more and eating less, which has a negative influence on their general condition. For example, this causes wetter droppings, which can incubate bacteria, fungus and yeast. The short-term instillation of smoke into the compartment during construction allows airflow to be visualized. The air inflow should enter above the level of the pigeons and exit out the roof.

The quality of pigeon houses is highly variable. During inspection, a check list will aid in identifying problems and making suggestions to correct these areas in the facility (eg, insulation materials used, ventilation errors).

The Number of Pigeons in the Loft

Overcrowding is an important cause of a poor loft environment (Fig 37.7). Crowding promotes feather dust, wet feces and excess moisture in expired air. Space is another consideration, as each pigeon needs its own space and territory. When birds are constantly competing for space, the number of birds is too high. Males are more competitive, so there should be fewer cocks than hens or chicks per cubic meter. When young pigeons reach 7 to 8 weeks of age, they begin to compete in the pecking order.

Over the past 10 years, the tendency of many fanciers has been to develop larger flocks each year, despite the fact that their facilities are not designed for expansion (Fig 37.8). Pigeon fanciers do not improve performance of the racing flock by simply producing more birds. Too many pigeons in improper facilities creates stress, increases dust, and, therefore, increases susceptibility to respiratory and other disease.

Fig 37.7 | A pigeon loft with a crowded outdoor flight cage creates an undesirable stressful situation.

Fig 37.8 | A youngster was mutilated as a result of overpopulation and stress.

Loft Space Guidelines

To avoid the problems of overcrowding, each loft should contain a maximum of two young pigeons, two adult females and one adult male per cubic meter. Therefore, in a loft of 2 x 2 x 2 meters (8 cubic meters), there can be 16 young pigeons, 16 adult females and 8 adult males. Other recommendations suggest a maximum population density of half this number per unit space. During fledging, some overpopulation is acceptable because of the better climatic conditions in the early months of the year, including low temperature and high humidity. Overpopulation is very unfavorable during the racing season (ie, high temperature, low humidity), so a major cull must occur just prior to the racing season.

Separating Groups by Age

The adverse effects of housing birds of different ages together are well-known in the poultry industry. The same effects are seen in mixed-age groups of racing pigeons. By advancing the breeding season and breeding the same stock several times each year, many fanciers are creating and maintaining several different age groups within a flock. This is acceptable if the facility has been designed to accommodate multiple age groups.

The goal is to breed enough young pigeons so the fancier has the opportunity during the first 2 to 3 months to select the pigeons that exhibit the desired qualities, culling the balance to prevent overcrowding and avoiding the pitfalls such as stress and disease that come with keeping too great a number of individuals.

Veterinary Support

The aims of veterinary support are to ensure a healthy flock, to minimize the losses and to maximize success during the racing seasons.

PREVENTIVE MEASURES

Proper husbandry practices should be followed at all times. This includes areas both in and around the loft.

Monitoring Procedures

Particular attention must be paid to general body condition, molting or feather disturbances, signs of *Salmonella* spp., ectoparasites and endoparasites that may be present in the feces. A swab from the crop and/or cloaca should be obtained for cytology and Gram's stains and cultures if disease is suspected in a bird. Necropsies of poor performers or birds showing signs of disease can be important for monitoring the disease status of the flock.

Vaccinations

Routine vaccinations are imperative. Regulations regarding these may vary among countries. Paramyxovirus vaccine (Fig 37.9) should be given after 3 weeks of age and thereafter once a year about 3 weeks before breeding. Poxvirus vaccine should be given after 5 weeks of age and thereafter once a year at least 3 weeks before racing season. Salmonella vaccine is given after 5 weeks of age, then twice at 2-week intervals and 3 weeks before breeding.

Preventive Medications

Trichomoniasis (Fig 37.10) is one the most common infectious diseases among racing pigeons in the Netherlands. Trichomoniasis causes an erosion of the pharyngeal mucosa and increases susceptibility to other infectious agents (Fig 37.11). Hexamitiasis is also common.

Examination of young pigeons at the time of vaccination against paramyxovirus has shown that 35 to 40% of these birds, which show no clinical signs, are infected with

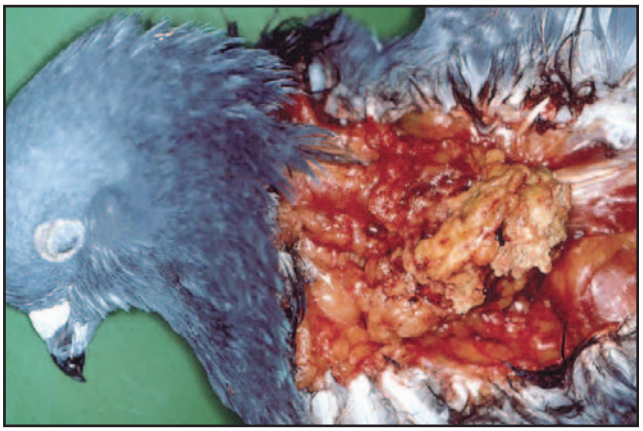

Fig 37.9 | Granuloma formation as a result of a vaccine reaction after using an oil-based paramyxovirus vaccine.

Fig 37.11 | Clinical signs of a combined infection with herpesvirus and trichomoniasis.

trichomonads. When clinical signs of respiratory disease are present, this percentage is much higher.

To control trichomoniasis, breeding pigeons should be treated when they are incubating their eggs. The offspring should then be treated at 5 weeks of age. Treatment consists of ronidazole once daily for 6 days and repeated for 3 to 4 days every 3 weeks. During the racing season, the pigeons should be treated every weekend upon their return from a race.

Medications should play only a minor role in the management of diseases in a loft. Use of medication should be based on a confirmed diagnoses. Refer to the literature for a more detailed discussion of medications and specifics on diseases.[12] Unfortunately, European fanciers are encouraged to overuse medications. Companies that sell medicaments frequently advertise their products in publications designed for pigeon fanciers. Treatment for coccidiosis or other endoparasites and Salmonellosis should only be performed when these conditions have been diagnosed. A common misconception among fanciers is that these treatments will improve racing performance.

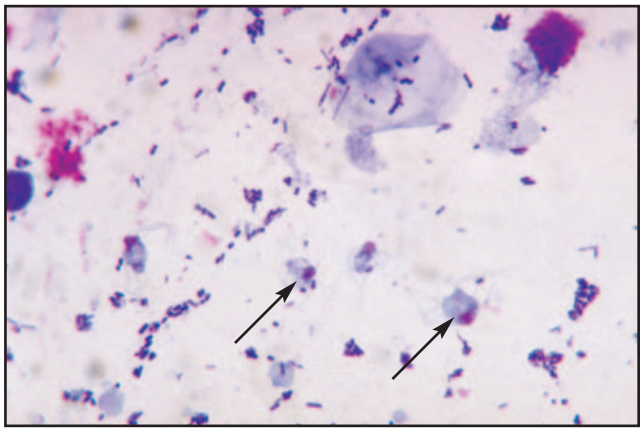

Fig 37.10 | Stained slide preparation of trichomoniasis (arrows).

The dosage of any medication is based on body weight. In general, 20 pigeons drink about 1 L of water per day, but intake can vary. Medications may also be administered in the food. A small amount of yogurt may be used as a vehicle in which to suspend medication that will adhere to the food.

The Presence of *Escherichia coli (E. coli)*

The presence of *E. coli* is considered a normal inhabitant of pigeons' intestinal flora. When *E. coli* is cultured at necropsy, it is important to look for concurrent viral diseases, especially circovirus, herpesvirus and adenovirus. Many fanciers will request bacterial cultures of sick or dead birds, and *E. coli* is frequently isolated. The fancier may mistakenly assume that the *E. coli* is the primary pathogen. Antibiotics sold over the counter are then administered to these birds. In the face of a viral infection, these antibiotics may not only be ineffective, but may also destroy the natural intestinal flora.

Veterinary Inspection of the Loft

The quality of veterinary support depends on the experience and knowledge of the veterinarian. The flock is considered the patient. Prevention is the creed. The veterinarian and the fancier should base their relationship on mutual respect and trust. The veterinarian's physically visiting the pigeon loft is an important part of the veterinary program.

When evaluating the loft, the veterinarian should note the physical facilities, including the direction the loft faces (preferably southeast); what materials were used for construction, insulation and roofing; the size of each loft; the amount of glass in front and on the roof; and what type of ventilation system is in use. He or she should note any trees, bushes, fences and buildings around the facility and evaluate them for safety and appropriateness (eg, ensure that there are no toxic plant materials or fencing that could prove harmful).

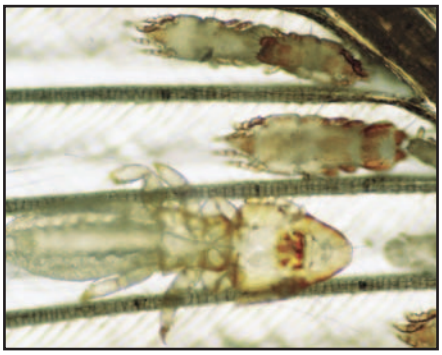

Fig 37.12 | Feather/quill mites.

Figs 37.13a | The slender pigeon louse, which can be considered harmless in small numbers, is a sign of poor health in large numbers.

Figs 37.13b | The small pigeon louse, which can cause much distress, is often found around the neck feathers and uropygial gland areas.

Fig 37.14 | Feces in the morning without distress at night.

Fig 37.15 | Feces in the morning as the result of distress at night because of mites and lice.

In evaluating the fancier's parasite control, the veterinarian should perform a thorough inspection of the birds for ectoparasites (Figs 37.12, 37.13a,b). Fecal examinations should be performed for endoparasites. Examining the cleanliness of the loft in general (Figs 37.14, 37.15), and the food and water sources in particular, is important for control of both endoparasites and potentially infectious microorganisms.

During this inspection, the veterinarian can verify that the population density and age separation criteria are appropriate, as well as noting and discussing nutrition, hygiene and other husbandry concerns that are significant.

Contagious Diseases

Contagious diseases are common, especially during the racing season. As discussed previously, preventing contagious diseases in racing pigeons is impossible (Fig 37.16). As a result, one must consider an individual flock as part of the whole pigeon population in the racing area and even as part of the whole racing pigeon sport, because birds travel between countries.

PREDISPOSING FACTORS THAT DETERMINE THE PATHOGENICITY OF A DISEASE

While it may not be possible to avoid all contagious infections in racing pigeons, there are many factors that influence the severity and scope of disease. Healthy, well-maintained birds will suffer lower morbidity and mortality than immune compromised birds. Some factors that increase the pathogenicity of opportunistic diseases include: malnutrition, overpopulation (birds lower on the pecking order are more susceptible), suboptimal climate conditions within the loft, combining different age groups in the same loft, adding new pigeons to the flock, stressful situations within the flock, and racing birds that are not in proper condition. Diseases and vectors such as salmonellosis, trichomoniasis, heximitasis, mites, lice and endoparasites, can be immunosuppressive and increase morbidity and mortality of contagious diseases.

INFECTIOUS DISEASES AND PARASITES

While the fancier and veterinarian must be vigilant for a wide range of possible debilitating afflictions, some are more prevalent than others. The main infectious illnesses of racing pigeons include: viral diseases, chlamydophilosis

Fig 37.16 | Release of pigeons from the transport trucks to start a race.

Fig 37.17 | Green-yellow urine is often a first sign of adenovirus and/or herpesvirus infection.

Fig 37.18 | The death of youngsters within 1 day can be associated with circovirus or salmonellosis.

and parasitic diseases such as lice, mites, roundworms (*Ascaridia*, *Capillaria*), tapeworms, coccidia, *Hexamita* spp., trichomonads and trematodes. Additionally, birds may contract combined infections, known as "ornithosis complex", of the upper respiratory tract.[12]

VIRAL DISEASES

In most viral outbreaks, an otherwise healthy flock that is properly managed will have only a few birds sick and only a small percentage will die.[12]

Paramyxovirus and Poxvirus

Vaccines are available for annual protection against paramyxovirus and poxvirus in racing pigeons. By law, in Europe, pigeon fanciers must vaccinate their pigeons against paramyxovirus. There is evidence that pigeon paramyxovirus and the paramyxovirus that causes Newcastle disease in poultry are distinct. Poxvirus infection is transmitted by mosquitoes. During an outbreak, do not allow the pigeons to bathe. The ideal environment would include higher-than-normal temperatures, good ventilation and controlled humidity. Disinfection of the pigeon loft is important when a viral infection is suspected. It also is essential that all aspects of management and husbandry be evaluated and corrected if necessary.

Adenovirus

Adenovirus type 1 is especially common in young pigeons. Adenovirus type 2 is seen mainly in older pigeons, causing acute hepatitis and acute death. Pigeons that appeared to be healthy at the time of putting them in the baskets for a race can be dead on arrival at the race venue. Clinical signs of an adenovirus outbreak include reduced appetite, excessive drinking, regurgitation, loose voluminous feces, abnormal urine (yellow to green instead of white) (Fig 37.17), weight loss and acute death.

Herpesvirus

Clinical signs may include epiphora, rhinorrhea and diphtheric plaques in the mouth, throat and/or trachea similar to those seen with trichomoniasis or poxvirus. Anorexia, polydipsia and yellow-green urates may be present due to hepatic involvement. Herpesvirus can also cause central nervous system signs, such as paresis and paralysis. Differential diagnoses for the encephalitic form include paramyxovirus, salmonella, intoxications and trauma. A definitive diagnosis is made post-mortem via histopathology and/or viral culture.

Circovirus

First reported in 1990 in California, circovirus also has been found in Europe since 1995. The main characteristics are juvenile mortality and multiple secondary infections (Fig 37.18). Outbreaks of other infectious diseases are common because of the immunosuppression caused by circovirus. Anemia and paralysis may also be seen, as well as feather abnormalities similar to those seen in affected psittacines.

Pigeons infected with circovirus may not respond to a vaccination against paramyxovirus, poxvirus or salmonella, resulting in serious consequences. When pigeons vaccinated against paramyxovirus develop the disease, the legislation in Europe requires that all pigeons in close contact with affected birds be euthanized.

The most important tool for diagnosing circovirus is to submit tissues of infected organs for histopathologic examination. The bursa of Fabricius is a target organ in birds less than 6 weeks of age. In Belgium, there is a concerted effort underway to create a special pigeon circovirus PCR test.

Management of a Viral Disease Outbreak

Diseased pigeons must be culled from the loft as soon as clinical signs are noted. It is important to realize that

asymptomatic pigeons may still be infected. Not every pigeon gets sick or dies when infected with a contagious viral disease. When faced with an outbreak of paramyxovirus or poxvirus, immediate vaccination, using precautions to prevent further spread of disease, is imperative. Sick pigeons must be examined for the presence of other infectious diseases. Endoparasites and/or salmonella often need to be addressed. Antibiotics should not be used unless there is a confirmed bacterial infection. Reduce the number of young pigeons to a maximum of two per cubic meter.

To support recovery of the pigeons a combination of amino acids, lactobacillus, minerals, electrolytes and vitamins should be provided in the food. Add apple cider vinegar or citric acid (1 g/L) to the drinking water to decrease gastrointestinal pH. Alternating the administration of echinacea and green tea may decrease the incidence of secondary bacterial and yeast infections. Increased fresh air ventilation will decrease the concentration of viruses and aerosolized irritants.

RESPIRATORY PROBLEMS

Respiratory problems are among the more common reasons for poor racing performance and are generally caused by a combination of environmental factors and microbial agents. Pigeons may be subclinical but demonstrate diminished performance. A thorough examination may reveal conjunctivitis, dacrocystitis and/or pharyngitis. The breathing sounds of a normal pigeon, like those of other birds, should be inaudible even when the bird is held to the ear or auscultated.

Clinical Signs Associated with Mild Upper Respiratory Problems

The fancier should always be alert to clinical signs that can signal respiratory problems in the flock. Some of the more easily noticed signs may include "swollen head" due to the feathers being more erect, especially around the ears; similarly, the feathers around the head and neck may no longer be smooth, but become rough and dull. The ceres may no longer be dry with the normal white collection of powder down, but instead are a bit darker or even grayish. Additional clinical signs include epiphora, head shaking and scratching, sneezing and dyspnea. The nictitating membrane is often inflamed and swollen and remains extended; fanciers call it "the film". The bird may exhibit frequent swallowing and tongue movement. The mucous membranes in the pharynx and esophagus become swollen, and often the choanal slit is closed. Mucus is often visible around the glottis and may become viscous and whitish. The choanal papillae may change in shape and, in more chronic cases, even disappear.

Fig 37.19 | Mild respiratory problems may show only a very subtle dampness around the naris.

Fig 37.20 | Severe respiratory problems including conjunctivitis.

Clinical signs can be very subtle (Fig 37.19), which is why most pigeon fanciers do not suspect an infectious disease even when performance is disappointing. Poor race finishers should be examined by a veterinarian in order to detect the more subtle clinical signs.

Clinical Signs Associated with Severe Upper Respiratory Problems

Severe upper respiratory clinical signs are more readily noted and can include a dirty, wet, discolored cere; conjunctivitis with discoloration of the eyelids; wet areas on the shoulder or back feathers from eye wiping; and respiratory congestion (Fig 37.20). The sounds may be dry or moist. In severe cases where a tracheitis or other deeper respiratory problem is involved, the pigeon may be gasping for air with an open beak and have exaggerated abdominal and tail movements. Yellowish flakes may be observed on the mucous membranes of the oropharynx and tongue and in the trachea. These may be combined with diphtheritic membranes.

Infectious agents that may be involved in respiratory diseases of pigeons include pigeon herpesvirus, pigeon poxvirus, circovirus, *Chlamydophila psittaci*, *Trichomonas* sp., *E. coli*, *Hemophilus* spp. and *Mycoplasma* spp.

Differential Diagnoses for Respiratory Diseases

Poorly performing birds should be thoroughly examined. In making a list of differential diagnoses, as in all birds, many other disease conditions can present as respiratory distress, including egg binding, serositis, tumors, cysts, severe infestation with worms or coccida, cardiovascular disease and anemia. The infectious agents previously mentioned must be considered, in addition to less commonly occurring mycotic infections. Husbandry, including air quality and ventilation, may also be contributory. Inhalation of toxic fumes may also cause upper and or lower respiratory signs (Table 37.1).

In practice, one is often contending with a combination of these different agents and the complicating factors of dust, crowding and malnutrition.

Treatment of Respiratory Diseases

Treatment will depend upon the etiologic agents involved and may include vaccination, improved ventilation, dietary supplementation as previously outlined and antimicrobials when indicated.

Several affected individuals should be culled while implementation of prevention and treatment protocols are instituted for the remainder of the flock.

Table 37.1 | Differential Diagnoses Based on Clinical Signs

Clinical Signs	Possible Causes
Loose, unformed feces (Fig 37.21)	• Endoparasites such as capillaria (Figs 37.22, 37.23), ascaridiasis (Fig 37.24), coccidiosis, hexamitiasis, trematodiasis, cestodiasis • Bacterial infections including *Salmonella typhimurium* var. *Copenhagen, Streptococcus bovis* • Viral infections including adenovirus, herpesvirus • Intoxications, excessive ingestion of moss, sand • Stress
Polyuria/polydipsia	• Paramyxovirus • Excessive dietary salt • Intoxications • Severe enteritis • "Spraying" is a lay term that refers to polyuria and loose feces. It occurs in youngsters of about 10 days of age when the parents stop feeding crop milk. It also is seen during the stress of mating. Causes for such symptoms should be investigated
Respiratory problems	• Improper loft conditions, eg, dust • Unseasonal weather: too hot, too cold or wet • Ornithose-complex • Trichomoniasis (Fig 37.25), tumors (Fig 37.26) • Herpesvirus • Tracheitis/air sacculitis • Obstructions within the trachea, syrinx (foreign body, mycoses, diphtheria) • Pneumonia • Ascites, egg binding, tumors, serositis, foreign body • Circulation problems • Obesity • Excessively high temperature • Bad general physical condition • Overpopulation, stress • Mixing different age groups
Diphtheric mucous membranes	• Trichomoniasis • Herpesvirus • Poxvirus (Fig 37.27) • There are many causes for these small yellow dots: *E. coli* (Fig 37.28) • Candidiasis
Disturbance of equilibrium	• Paramyxovirus • Herpesvirus • Salmonella • Intoxication with substances such as dimetridazole, (Fig 37.32) or aminopyridine salt • Encephalitis - trichomoniasis (Figs 37.29-37.30) • Trauma • Debilitation and emaciation-seen in birds returning from a race in inclement weather • Anemia
Drooping wing, leg lameness	• Salmonella • Arthritis • Myositis caused by *Streptococcus bovis* • Muscle damage subsequent to trauma • Fractures • Joint luxations (Fig 37.33) • Paralysis subsequent to egg laying (Fig 37.34) • Paramyxovirus • Leg swells under band (Fig 37.35)
Abnormal feathers	• Malnutrition-for dietary considerations[12] • Can be caused by medication such as fenbendazole administered during the molting period • Corticosteroids are reason for a delay in molting and typical growth lines (Fig 37.36) • Paramyxovirus • Circovirus • Chronic diseases such as salmonellosis

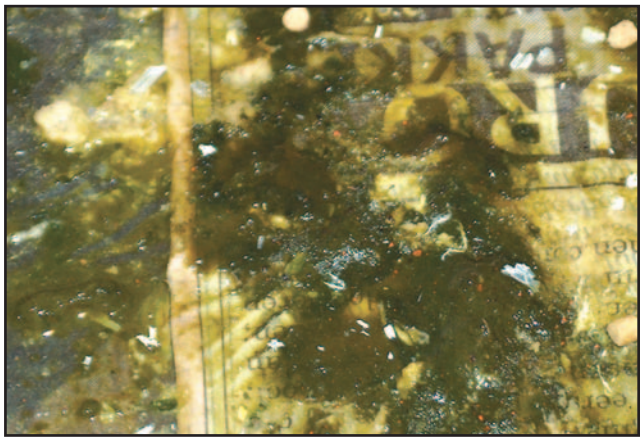

Fig 37.21 | Abnormal feces caused by hexamitiasis in young pigeons.

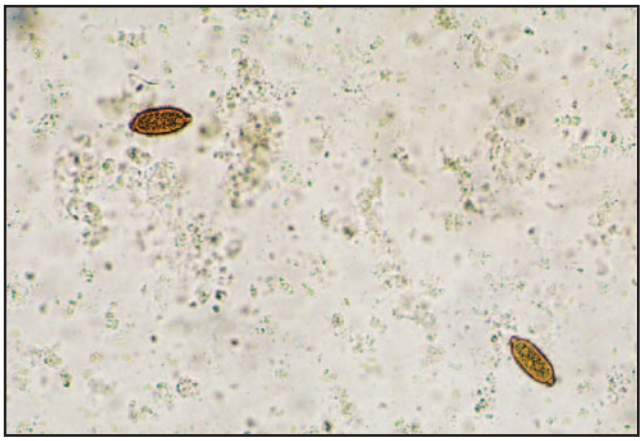

Fig 37.22 | Eggs of capillaria.

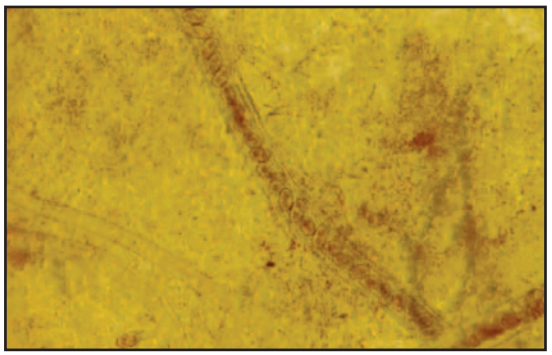

Fig 37.23 | Capillaria under the microscope, note the eggs of the capillaria in the parasite's body.

Fig 37.24 | Intestines with ascarid obstruction.

Fig 37.25 | Obstruction of the glottis by a diphtheric mass often seen with trichomoniasis.

Fig 37.26 | Swelling of the mucous membranes caused by a carcinoma.

Fig 37.27 | Poxvirus lesions of the eyelids, beak and tongue.

Fig 37.28 | White spots are the accumulation of cellular debris in the mucus glands of the palate. Histopathologically these are often described as "lymphoid aggregates" and suggest a cellular immunologic reaction in response to a locally infectious agent.

Fig 37.29 | Torticollis in a young pigeon caused by an unusual infection with trichomoniasis.

Fig 37.30 | The youngster in Fig 37.29 at necropsy showing yellowish fluid surrounding the brain.

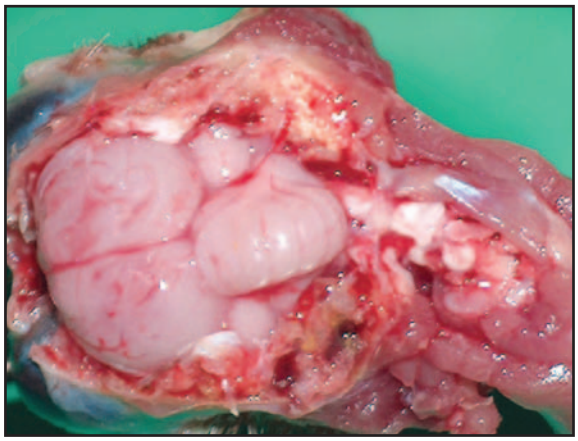

Fig 37.31 | Necrotic brain tissue in the bird in Figs 37.29 and 37.30.

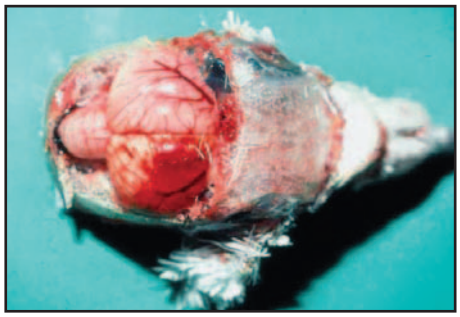

Fig 37.32 | Hemorrhage as a result of dimetridazole intoxication causing central nervous signs.

Fig 37.33 | Luxation of the shoulder causing the wing tip to point upward.

Fig 37.34 | Reversible paralysis after egg laying.

Fig 37.35 | A leg band has been accumulating hyperkeratotic debris from malnourished skin and the resultant constriction acts like a tourniquet, requiring band removal to save the leg.

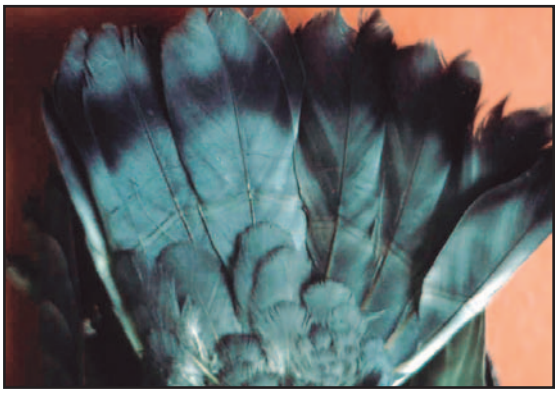

Fig 37.36 | Feather growth abnormalities are seen after administration of corticosteroids or fenbendazole overdose.

References and Suggested Reading

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