

Diseases of stiff-tailed ducks in captivity

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Introduction

This is the fifth of a series of reports that will analyse post-mortem findings of birds dying in the Wildfowl Trust collections since 1959. Detailed records have been kept by J. V. Beer (1959–1969), by N. A. Wood (1970–1972) and by M. J. Brown subsequently.

Within the stifftails *Oxyurini* we have included the following: the White-headed Duck *Oxyura leucocephala*, North American Ruddy Duck *O. jamaicensis*, Argentine Ruddy Duck *O. vittata*, Blue-billed Duck *O. australis*, Maccoa Duck *O. maccoa*, Musk Duck *Biziura lobata* and Black-headed Duck *Heteronetta atricapilla*. We have also added the White-backed Duck *Thalassornis leuconotus*, which was placed with the stifftails by Delacour (1959) but is thought by Johnsgard (1967) to be more closely related to the whistling ducks *Dendrocygna*. *Oxyura dominica* and *O. ferruginea* are not considered in our study as neither has been held in captivity for long, nor has either species bred.

The stifftails are a widely distributed, low latitude group. They are highly aquatic and specialized for diving, mainly inhabiting freshwater or brackish marshes and lakes. Except for the Musk Duck, stifftails are sexually dimorphic in plumage, have short or non-existent pair bonds, and differ from other waterfowl in having a twice yearly wing and tail moult. They are summer breeders in captivity at Slimbridge. Egg-laying seasons there tend towards the symmetrical pattern observed in the whistling duck and some 'primitive' perching duck, so that breeding occurs before and after mid-summer, rather than only in the spring as is typical of most north temperate waterfowl (Murton & Kear 1978). All, except possibly the Musk Duck, mature in their first year. The Black-headed Duck is an obligate brood parasite of other marsh nesting birds including rails, ducks and herons.

History in captivity

Stifftails have been taken into captivity only relatively recently. The North American Ruddy Duck was bred in approxi-

mately 1935 by C. S. Sibley in Connecticut and C. Wilson at Salt Lake City; soon after 1936 it nested for the first time in Britain at Walcot Hall (Delacour 1959). The species now has a well established feral population in England; breeding by birds that had escaped from Slimbridge started in 1960, and numbers have increased steadily to several hundred pairs (Hudson 1976). The White-headed Duck bred for the first time at Slimbridge in 1973 (Matthews & Evans 1973). The Maccoa was first hatched as recently as 1974, the Argentine Ruddy Duck nested in 1975 and the Black-headed Duck in 1977, all at Slimbridge. Captive Australian Blue-billed and Musk Duck have not yet reproduced. The Madagascan White-backed Duck laid at Foxwarren Park, England in 1931 (Ezra 1931), but the African race was not hatched until 1965 at Slimbridge (Johnstone 1966). In general, stifftails have the reputation of being 'difficult' for the aviculturalist, and the ducklings are particularly hard to hand-rear.

Materials

Post-mortem data from 439 stifftails dying between 1959–1980 have been examined. These consist of 65 adults, 77 juveniles and 297 downies (Table 1). Sixteen adult and eight downy White-backed Duck were also examined. The only species of which a large number of individuals was available is the North American Ruddy Duck. An adult bird is defined as one that has survived to its first January. A juvenile is fully

Table 1. Number of stifftails dying in Wildfowl Trust collections 1959–1980.

	Adults	Juveniles	Downies	Total
<i>Oxyura</i>				
Ruddy Duck	55	70	276	401
<i>Biziura</i>				
Musk Duck	1	2	0	3
<i>Heteronetta</i>				
Black-headed Duck	9	5	21	35
<i>Thalassornis</i>				
White-backed Duck	16	0	8	24

feathered, but dies in its first calendar year before 1 January. A downy is any young bird that is not fully feathered. This investigation differs from the others we have made in that dead ducklings outnumbered the other age classes by almost four to one.

Results

As stifftails have only recently bred in captivity, most adults examined were originally wild-caught, and our data on longevity, as on many other aspects of mortality, are inadequate. The age at death of 18 adult captive-bred stifftails is known, and on average was 2.4 years. The average for ten females was 3.0 years and for eight males was 1.8 years. The oldest birds were a 5-year-old female White-headed Duck and a 5-year-old male Black-headed Duck. Elsewhere we have been told of a female White-headed Duck that was at least 12-years-old at death, and a male Duck at least 11-years-old (M. Carbonell, pers. com.). Alive at Slimbridge at the moment are a 12-year-old White-headed Duck and a wild-caught Musk Duck that is at least 11 years of age.

Five White-backed Duck wild-caught as adults reached an average age in captivity of eight years, the oldest being a male that lived until he was 12 years old.

Seasonal mortality

In part because of the small number of captive adults whose month of death is known (59), it is not easy to obtain a clear picture of stifftail seasonal mortality (see Figure 1). Males seem to die mainly in the winter (22% in February) and in early

summer (30% in May and June) and there is another peak of mortality in autumn (15% in October). Females, on the other hand, die in the spring and early summer (33% from March to June inclusive), and again in autumn and early winter (40% from September to December). Stifftails show neither the very high levels of mortality in the spring that are typical of captive temperate waterfowl, nor the exclusively winter mortality that is normal for tropical and low temperate duck species. It is possible that the twice yearly wing and tail moult puts two periods of stress on the birds, and that this complicates their mortality pattern. More study of this aspect is required.

White-backed Duck show no tendency to die more frequently in the winter months either, although only 16 post-mortem examinations of adults were available for analysis. We assume that *Thalassornis* moults only once a year, but are unaware of any investigation of the matter.

At post-mortem examination a primary cause of death was assigned and it is these conditions that are discussed below. For information on treatment and prevention of disease the reader is referred to Hillgarth and Kear (1979a), Beer (1959) Beer and Stanley (1965), Arnall and Keymer (1976) and The Game Conservancy (1974).

Tuberculosis

Avian TB at 20% was one of the main causes of death in adult stifftails (Table 2). Four North American Ruddies (10% of the species), seven female White-headed (58%), one Maccoa and one Black-headed Duck were affected. Ten White-backed Duck (63%) also died of tuberculosis.

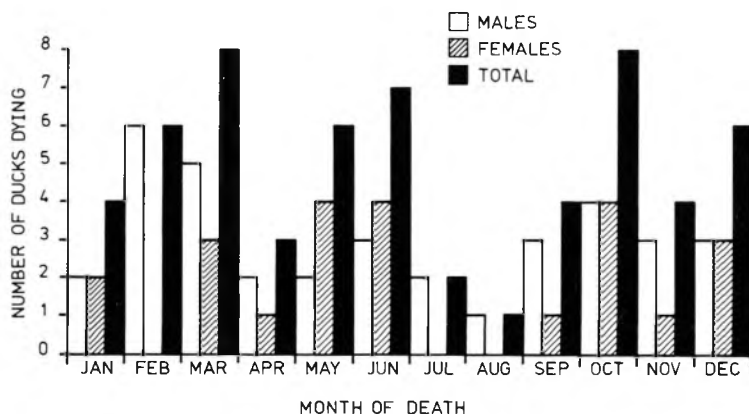


Figure 1. Deaths of 60 captive adult stifftails month by month.

Trauma

Trauma at 20% was the second major cause of death amongst adults (Table 2) and was also a serious factor in the death of juveniles (14%). Seven North American Ruddy adults (18% of the species), three Black-headed (33%) and three White-headed Ducks (25%) died of trauma, and among juveniles eight North American Ruddies (18%), two Black-headed Duck (40%) and one White-headed Duck were affected. Of the White-backed Duck, two adults (13%) were fatally wounded.

Enteritis

Enteritis was fairly common in adult stiff-tails (17%), but far more serious for juveniles (26%) and downies (34%). Among the adults, nine North American Ruddy Duck (23%) and one Black-headed Duck had enteritis. Of the juveniles (Table 3), 12 North American Ruddies (27%), two Mac-

coa, two Argentine Ruddies, three White-headed (20%) and one Black-headed Duck had the disease. Of the downies, 46 North American Ruddies (25%), nine Black-headed Ducks (43%), nine Argentine Ruddies (40%) and 35 White-headed Duck (51%) succumbed. There were no cases of enteritis in the White-backed Duck.

Pneumonia

Pneumonia was not a great problem for adults (5%), but serious for juveniles (14%) and, as can be seen in Table 4, the most important cause of mortality in downies (38%). Among adults, three North American Ruddies died of pneumonia. Among juveniles, seven North American Ruddies (16%), one Black-headed Duck, one White-headed Duck, one Blue-billed and one Musk Duck were affected. Pneumonia killed 91 downies of the North American Ruddy Duck (49%), four Maccoa (44%), nine Black-headed (43%) and eight White-headed Duck (12%). Out of

Table 2. Causes of death in 65 captive adult stiff-tails.

Cause of death	Male	Female	Unsexed	Total	%
Tuberculosis	5	8	—	13	20
Trauma	3	9	1	13	20
Enteritis	8	3	—	11	17
No diagnosis	5	4	—	9	14
Parasites	3	—	—	3	5
Egg peritonitis*	—	3	—	3	5
Pneumonia	1	2	—	3	5
Renal failure	1	1	—	2	3
Lead poisoning	1	1	—	2	3
Tumours	2	—	—	2	3
Hepatitis	1	—	—	1	1
Aspergillosis	—	1	—	1	1
Septicaemia	—	1	—	1	1
Pericarditis	—	1	—	1	1
Totals	30	34	1	65	

* 9% of adult females.

Table 3. Causes of death in 77 captive juvenile stiff-tails.

Cause of death	Male	Female	Unsexed	Total	%
Enteritis	10	9	1	20	26
Pneumonia	6	5	—	11	14
Trauma	6	5	—	11	14
Aspergillosis	7	4	—	11	14
Impaction	3	7	—	10	13
Acuaria	4	1	—	5	6
Renal failure	1	2	—	3	4
Air sacculitis	1	2	—	3	4
No diagnosis	2	—	—	2	3
Septicaemia	1	—	—	1	1
Totals	41	35	1	77	

Table 4. Causes of death in 297 downy stifftails.

Cause of death	Male	Female	Unsexed	Total	%
Pneumonia	56	53	3	112	38
Enteritis	50	49	1	100	34
Infected yolk	15	23	2	40	13
Renal failure	8	3	1	12	4
Impactions	4	6	—	10	3
No diagnosis	—	3	—	3	1
Air sacculitis	—	2	—	2	1
Bacterial infection	—	2	—	2	1
Other conditions	9	6	1	16	5
Totals	142	147	8	297	

15 dead adult and eight downy White-backed Duck, one adult and four downies (50%) had pneumonia.

Aspergillosis

The incidence of aspergillosis was low in adult stifftails (2%), although higher in juveniles (14%). Two North American Ruddy (4%) and six White-headed juveniles (40%) were found to have aspergillosis at death. One adult male Musk Duck (not included in this analysis) died in quarantine after a journey from Australia, with severe aspergillosis affecting both lungs; this case suggests that stress is likely to intensify fungal growth.

Impactions

There were no records of impactions in dead adult stifftails, but impactions of the gut were a problem in juveniles (13%); juveniles of seven North American Ruddy Duck (16%), two Argentine Ruddies and one White-headed Duck were affected. Three per cent of downies also had impactions.

Infected yolk

Fourteen per cent of downies had died because their yolk sacs had become infected. This condition affected 17 North American Ruddies (9%), 20 White-headed (29%), one Maccoa, one Black-headed and one Argentine Ruddy Duck. Among the White-backed Duck, four downies or half the total had infected yolk.

Internal parasites

Five per cent of adults and 7% of juveniles

had severe parasite infestations, all being infected with *Acuaria*.

Renal failure

Renal conditions, which are fairly common in all the waterfowl we have examined so far, appear to be unusual in stifftails as a primary cause of death (3% of adults, 4% of juveniles and 4% of downies). However, many cases of enteritis had connected renal problems.

Other conditions

Egg peritonitis affected 9% of adult females. Lead poisoning killed 3% of adults (Beer & Stanley 1965), and cardiac conditions were found in 2% of adults. In adult White-backed Duck, there was one case of egg peritonitis, one case of wet feather and one of hepatitis.

No diagnosis

The cause of death in 14% of adults, 3% of juveniles and 1% of downies was undetermined.

Discussion

Neither the stifftails nor the White-backed Duck are so liable to cold stress as are captive whistling duck (Hillgarth & Kear 1981). This is perhaps surprising in view of the low latitude origin of all groups. However, the greater adaptation to water-living of the stifftails and White-backed Duck has produced a subcutaneous layer of body fat that may stand the birds in good stead in severe conditions. The high level of pneumonia in all age classes, and particularly in the ducklings is, on the other

hand, a possible indication of tropical origin.

Avian tuberculosis is less common in the stiffetails than in any waterfowl so far examined, and has not been recorded at all in young birds. However, the high incidence in White-headed Duck probably indicates that immunity is not general in the group, and that our sample size is yet too small for firm conclusions to be drawn. We do not know why enteritis affects so many of the birds, but the fact that stiffetails are peculiarly susceptible to inflammation of the gut is known to most aviculturalists. Perhaps their feeding habits make them more than usually prone to intestinal disorders. The high incidence of trauma is also unexpected, and hard to account for, as the P.M. records often do not state what the trauma was due to.

Internal parasites are unusual, perhaps because of a rarity of their secondary hosts. Renal failure is also uncommon but, as has been pointed out, this may be masked by the frequency of enteritis. Aspergillosis is rare and it is worth noting that no cases of candidiasis were recorded. Atherosclerosis was found by Humphreys and Beer (1971) in one White-headed Duck and in one White-backed Duck; if birds lived for longer in captivity, this degenerative condition might be more frequent. 'Egg-binding' and

peritonitis associated with egg-laying are fairly common, perhaps reflecting the relatively large egg-size—14.3% of body weight in the Ruddy Duck, 15.4% in the Argentine Ruddy and 11% in the White-backed Duck (Lack 1968).

We have inadequate data to say whether in its diseases *Thalassornis* resembles *Dendrocygna* more than it does *Oxyura*. The high level of TB, and lack of enteritis does suggest perhaps that the Whiteback is not a 'typical' stiffetail.

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Summary

Results of post-mortem data from 439 stiffetails and 24 White-backed Duck dying in Wildfowl Trust collections between 1959 and 1980 have been analysed. The main causes of death are enteritis, pneumonia, tuberculosis and trauma. There was a low level of renal failure, parasite infestation and of aspergillosis.

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