

Abnormal plumage in possibly senile female Eiders *Somateria mollissima*

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A collection of 460 Eiders that had fallen victim to an oil-pollution incident in the Wadden Sea in January 1987 was studied. Three individuals, initially classified as 2nd-calendar-year males on the basis of plumage characteristics, had divergent patterns on head and wing. Autopsies revealed that all were adult females: they had no testis and no bursa Fabricius, but an ovarium with a convoluted oviduct and female bulla ossea. It was concluded that the birds had a disturbed hormone balance, and probably were senile.

Following these observations, two such birds were found among 43 dead Eiders that had been washed ashore on Texel in the winter of 1987–88 and another was discovered alive among a group of adult, non-breeding Eiders in the Vlieland colony (The Netherlands) in May 1987. None of the c. 7500 breeding females handled for ringing during the past 25 years showed any sign of a male-like plumage. It may well be that such birds are more common in the non-breeding group, but that they have been misidentified as immature males during former field observations. The findings suggest that some females from the non-hunted Dutch Eider population may die of old age.

During an oil-pollution incident in The Netherlands in January 1987, 1157 Eider *Somateria mollissima* victims were collected along the shores of the western Wadden Sea. They were sexed and aged on their plumage characters. Five groups were distinguished: males in 2nd-, 3rd-, or older than 3rd calendar year and females in 2nd or older than 2nd calendar year. As in other slowly maturing birds with sexually dimorphic plumages, the plumage of the Common Eider usually provides a good criterion for determination of sex and age (Palmer 1962, Bauer & Glutz von Blotzheim 1969, Cramp & Simmons 1977).

A sub-sample of 460 only slightly contaminated birds was studied in more detail. Among these birds, three individuals were classified as immature males due to their plumage characteristics: dark upper parts mottled with white feathers; cheeks, throat and neck white mottled with dark feathers; breast largely white with a pink glow; undersides and flanks largely black with a white patch on both sides of the rump (Fig. 1). When the wings were opened, doubt arose as to their correct age. The wing feathers were more or less uniformly sepia-coloured, as could be expected in a 2nd-calendar-year male in January. But a

fair number of the median and lesser coverts were white, as were the inner webs of the tertials. Scattered white feathers in a juvenile wing are highly unusual. White wing-coverts and tertials do occur in older males, but the white feathers appear after the prebasic moult in the summer and autumn of the 2nd calendar year. Then already most of the median and lesser coverts become white.

At closer inspection of the plumage, it appeared that the three aberrant birds showed small differences although their general appearance was the same. On all, the crown and upper parts of the nape were brown as in females, but with a variable number of white feathers. The white feathers of the cheeks extended to above the eyes, unlike the situation in normal males who have a black ocular region. There was no sign of greenish feathers on the upper nape and there was no indication of a differently coloured streak from the centre of the crown to the nape as is usual in males. Most flank feathers were black or very dark; some showed bars and looked like melanistic female feathers. The white spot on the flanks was not fully developed as in adult males. The spots were surrounded by brown-barred feathers like the flank feath-

ers of females. The black feathers on the underside looked fresh as in adult Eiders and not worn or partly brown as in most of the collected 2nd-calendar-year birds. The breast was as in immature males, with many of the white feathers barred with dark brown or black.

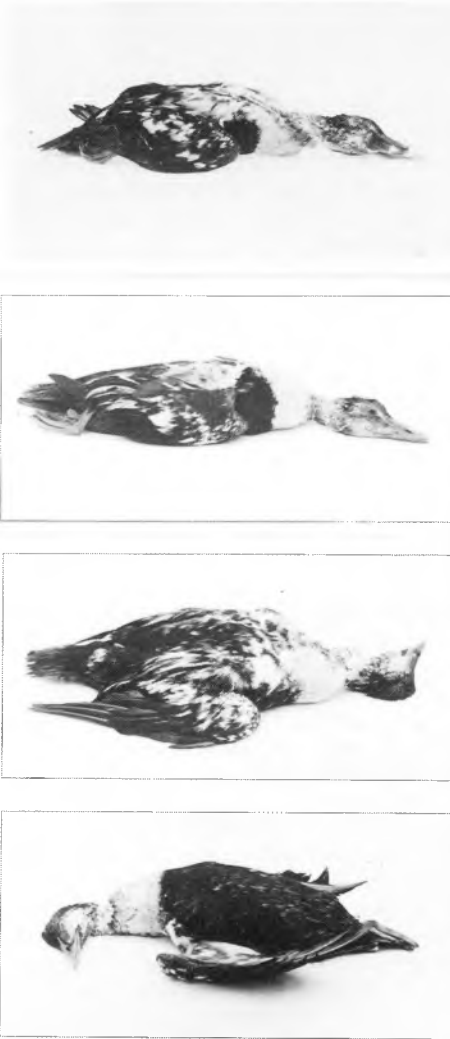


Figure 1. Three adult female Eiders in male-like plumage. Significant are the occurrence of varying numbers of white coverts on the wing and in the occipital region of the head. a. Female with ring Arnhem 7009844 found in December 1987. b. Female no. 29 found in January 1987. c. Female no. 52 found in January 1987. d. Female no. 52 showing the underside. All birds were collected in the western part of the Wadden Sea, The Netherlands.

Autopsies revealed that the three individuals concerned had an ovary and thus were females. The oviducts of the three birds were wide and convoluted like those of the other adult females in the sample. This indicates that the birds had laid eggs at least once in their lives. The ovaries were at rest, as in the other females in the sample, but those of one bird (no. 52) appeared obviously atrophied. There was no sign of a testis in any of the birds and there was no trace of a bursa Fabricius.

The bullae of the females with the male-like plumages were as in normal females. Male Eiders possess a bulbous bulla ossea (also known under the names of syrinx, ampulla or tympanum) that is inflated to the right (Humphrey 1958). In the female this organ is as wide as the trachea (Fig. 2). This difference between the sexes can easily be used even for sexing ducklings directly after hatching (Swennen *et al.* 1979).

The measurements of wing, head and tarsus of the abnormal birds fall well within the range of the normal birds in the sample (Table 1). They almost certainly belong to the same wintering population which is, according to ringing data, a mixture of birds from the Wadden Sea and the Baltic Sea (Swennen 1976).

Because of these observations, special attention was paid to Eiders in immature plumage. Three new cases were found in the following year. One such female was discovered in a group of adult Eiders on an exposed mudflat near the Eider colony on the West Frisian Island of Vlieland during field work on 7 May 1987. General size and bill size were like the other females in the group. The plumage of the bird was similar in appearance to the three dead birds studied, but it had more female brown feathers on the flanks, although the white patch on the sides of the rump near the tail base was present. While other adult females were intensively courted by several adult males (most females were on their nests), the aberrant female was neglected. It carried a leg ring, as do many of the females breeding on Vlieland, so it was probably a local bird.

In the winter of 1987–88, 43 dead Eiders that had been washed ashore on the island of Texel were collected and taken to our laboratory. Among these dead birds were two adult females in the abnormal, male-like plumage (Fig. 1). They had all the

characteristics found in the dead birds mentioned above and furthermore, the ovaries of the birds were atrophied. Moreover, one

of the birds had been ringed as a breeding female of unknown age in the colony on Vlieland in May 1970. The bird had been

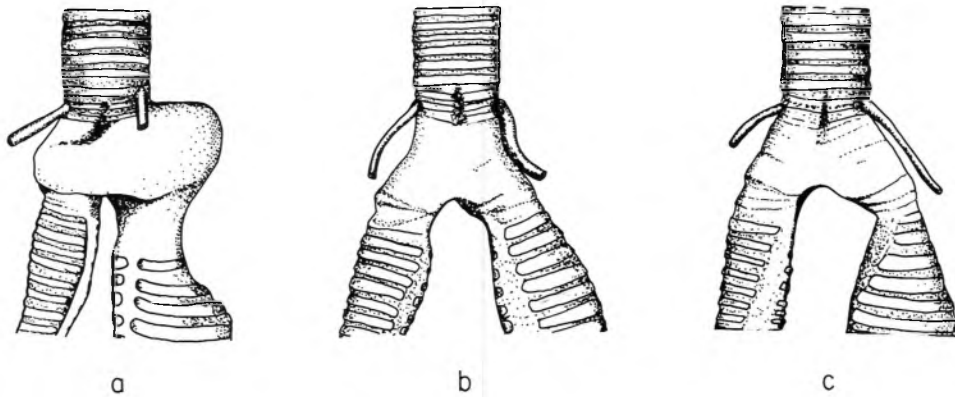
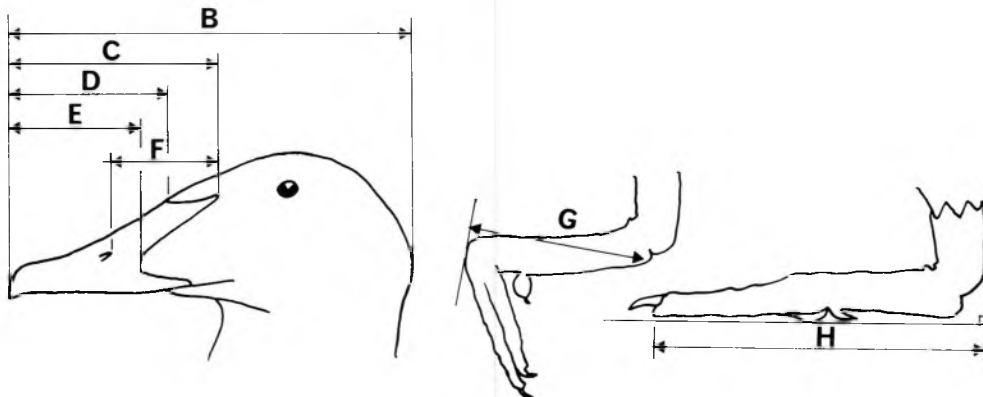


Figure 2. Ventral views of the junction of trachea and bronchi with bulla ossea of Eiders. a. normal adult male (no. 40), b. normal adult female (no. 46), c. adult female with male-like plumage (no. 52).

Table 1. Comparison between measurements of three adult female Eiders with male-like plumages and values from a random sample of normal adult females. All birds were collected in the western Wadden Sea, The Netherlands, in January 1987.

	Male-like females			Normal females (n=68)		
	W87/29	W87/45	W87/52	mean	s.d.	range
A.	293	298	302	301.0	7.7	(280–315)
B.	126	128	115	125.4	3.8	(115–134)
C.	75.2	74.7	71.6	72.5	2.4	(64.9–78.3)
D.	53.9	56.7	51.8	53.7	2.5	(46.2–60.6)
E.	37.2	36.0	35.5	35.5	1.8	(31.0–41.9)
F.	35.0	34.0	31.7	33.9	2.2	(29.1–42.0)
G.	54.3	50.9	50.8	51.0	2.9	(34.1–55.2)
H.	142	133	134	137.2	4.7	(126–150)

Lengths (mm) of: A. wing, B. head and bill, C. total bill, D. culmen midline, E. tip of bill to lateral feathering, F. posterior end of nostril to tip of frontal extension, G. tarsus, H. tarsus and toe.



examined alive while breeding at the same site in May 1974 and while conducting ducklings on a nearby intertidal flat in June 1979. No abnormal feathers were observed on either occasion. It was found dead with abnormal plumage on 16 December 1987.

Discussion

Plumage characteristics are a reflection of the hormonal status of an individual during the foregoing moult. Castration of females leads to a male plumage in the Mallard *Anas platyrhynchos* because of changes in hormone production (Caridroit 1938). The same happens in a duck with ovarian tumours (Lonnberg 1926). A reduction in the level of female hormone through the atrophy of ovaries from age or disease (Harrison 1985) may also result in females assuming male plumage in pheasants *Phasianus* sp. and domestic fowl *Gallus* sp.

Therefore, the hormonal balance in the adult females with the male-like plumage was probably disturbed. In three cases the ovary was atrophied, but it is possible that we overlooked minor changes in the gonads of the other two birds. The ovaries of abnormal and normal birds were still at rest, but their condition was not suited for a

closer inspection. The absence of a male-like modification of the bulla indicates that the birds had been female since hatching. Hormone injections or castration can modify the morphological sex of the bulla only when administered before an embryo has been incubated for 18 days (Lewis & Domm 1948, Wolff 1954).

The indifferent behaviour shown by males towards the aberrant female near Vlieland may have been caused by her plumage. However, hormonal influences may also have meant that she no longer smelt like a productive female. The smell of females seems to activate and direct courting behaviour in males (Balthazart & Schoffeniels 1979).

Some white or albinistic feathers are found regularly in breeding females with no signs of an increase with age (Swennen 1974, 1976). But, during 25 years of ringing Eiders on their nests, in none of 7422 breeding females captured or recaptured has indication of a male-like plumage been observed. Therefore we conclude that females in such an aberrant plumage are no longer reproductive, but old and senile. This suggests that some individuals of the non-hunted Dutch Eider population die of old age.

References

- Balthazart, J. & Schoffeniels, E. 1979. Hormones are involved in the control of sexual behaviour in birds. *Naturwiss.* 55:55–56.
- Bauer, K.M. & Glutz von Blotzheim, U.M. 1969. *Handbuch der Vögel Mitteleuropas* 3. Akademische Verlagsgesellschaft, Frankfurt am Main.
- Caridroit, F. 1938. Recherches expérimentales sur les rapports entre testicules, plumage d'éclipse et mues chez le Canard sauvage. *Travaux Zool. Wimereux* 13:47–67.
- Cramp, S. & Simmons, K.E.L. 1977. *Handbook of the birds of the Western Palearctic* 1. Oxford University Press.
- Lewis, L.B. & Domm, L.V. 1948. A sexual transformation of the osseous bulla in duck embryos following the administration of estrogen. *Physiol. Zool.* 21:65–69.
- Lonnberg, E. 1926. Nagra honlige grasander, *Anas platyrhynchos* L. i hanlig draht. *Fauna och Flora* 4:176–181.
- Palmer, R.S. 1962. *Handbook of North American birds* 1. New Haven.
- Harrison, C.J.O. 1985. Article 'Plumage'. In: Campbell, B. and Lack, E. (Eds.). *A dictionary of birds*. T. & A. Poyser, Calton.
- Humphrey, P.S. 1958. Classification and systematic position of the Eiders. *Condor* 60:129–135.
- Swennen, C. 1974. Afwijkende kleuren bij de Eidereenden van Vlieland. *Limosa* 47:51–52.
- Swennen, C. 1976. Populatie-structuur en voedsel van de Eidereend *Somateria m. mollissima* in de Nederlandse Waddenzee. *Ardea* 64:311–371.
- Swennen, C., Duiven, P. & Reyrink, L.A.F. 1979. Notes on the sex ratio in Common Eiders *Somateria mollissima* (L.). *Ardea* 67:54–61.
- Wolff, E. 1954. Le rôle des hormones embryonnaires dans la différenciation sexuelle primaire des oiseaux. *Proc. 11th Int. Orn. Congr. Basel*:86–103.