THE FLIGHTLESS PERIOD OF THE MALLARD IN ENGLAND

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Summary

CAPTURES of flying and flightless Mallard in cage-traps at Abberton, Essex and of flightless Mallard at Slimbridge confirm that the timing of the wing-moult in males and females in England is similar to that found in Holland. Flightless males are found from early June to mid-August, females from late June to September and occasionally October. The spread of the female moult is due to variation in individual breeding success, females normally not moulting until their young are fledged. From records of ringed males of known age it appears that males one and two years old tend to become flightless ahead of the majority of older birds.

It is well known that adult Mallard *Anas platyrhynchos* are rendered incapable of flight for a period each year as a consequence of the simultaneous moult of the primaries and secondaries. But because ducks are hard to find when in this condition there is little precise knowledge of the timing of the wing-moult or its duration, though Hochbaum (1944) has provided a valuable account of the behaviour of ducks moulting in Manitoba and more recently several investigations in the Netherlands (Lebret 1949, Timmermann and Lebret 1951, Eygenraam 1957) have yielded a detailed picture of the sequence of events in the Dutch Mallard population. Millais (1902) gives an account of the behaviour of Mallard based on material collected by him in Scotland and in the London area which differs considerably from that of the authors just mentioned, so that it seems worthwhile to record data obtained in the last six years at two English ringing stations which bear on the apparent differences.

According to Hochbaum some captive Mallard completely renew the wing within $2\frac{1}{2}$ weeks after the old flight feathers are dropped, but in most individuals the interval is between three and four weeks. Timmermann and Lebret estimated that Dutch Mallard could fly again after 23-24 days, before the growth of the new primaries was complete. No Mallard males with primaries longer than 14 cm. could be caught in the nets used by them for catching moulters. Observations on captive Mallard at Slimbridge indicate a flightless period of 24-26 days. Occasional captures of wild birds can scarcely be expected to give much information on this point, and the only record of real value is of a male first caught at Slimbridge on 3rd June, 1959 (an early date), which was still not able to fly on its new flight feathers 26 days later.

Millais made no clear statement on the length of the flightless period, but he made several about the times at which the flight feathers are shed. He regarded the first fortnight in August as the peak period of flightlessness in males, in the middle of the period of eclipse, given as 15th June to 10th October. One of the specimens he illustrates had shed all its old flight feathers on 6th July, although it retained much of the spring body plumage. Millais evidently regarded this as exceptional : and three of the four specimens he illustrates, which had been collected (method unknown; presumably shot) from 6th to 9th August, appear to have wings incapable of flight. The recent investigators have found flightless males much earlier. Hochbaum noted some flightless before the middle of June, the peak of the flightless period in mid-July and many flying again by the first week in August. Counts by

Timmermann and Lebret in the Netherlands gave a similar picture, the first males without flight feathers being seen on 5th June, the peak period being around 8th July and most males flying again by 1st August.

According to Millais the occurrence of the female wing-moult is phased so that successful females regain the power of flight at the time their offspring begin to fly. Females compelled to re-nest delay their moult by the appropriate interval, so that " adult females moulting and sometimes incapable of flight (may be found) at any time between the months of June and September." Later authors agree that flightless females may be found at any time in this long period and even in October, but their observations make clear that Millais was wrong in suggesting that females normally moult while still in charge of their broods. According to Timmermann and Lebret females with very late, repeat, broods are the only ones which sometimes show wing moult.

The capture of ducks in cage-traps at Abberton Reservoir, Essex, provides the bulk of the new evidence presented here on the timing of the flightless period in England. The traps are operated throughout the year. The numbers of ducks caught in the summer are relatively small and from 1953 to 1957 included only two flightless birds in a total of 275 adult Mallard caught in the months June to September. In the summers of 1958 to 1960 the situation changed greatly, flightless birds comprising two-fifths of the catch of 198 adult Mallard in the period 11th June to 30th September. Why the proportion of flightless ducks in the catch has increased so greatly is not known, since the trapping technique has not been altered and no clear change in the behaviour of the summering population is known to have occurred. The catches of adult Mallard in summer in the years 1958 to 1960 are shown in Table 1, grouped by sex and into the categories 'flightless' and 'flying.' The captures of flightless birds show a pattern like that reported from Manitoba and from the Netherlands, males tending to moult earlier than females and doing so more nearly simultaneously.

An early August peak of flightlessness among males, as reported by Millais, is not apparent in the Abberton catches, but they do show signs of a double peak, early and late in July. The females also show a double peak, around 10th August and again early in September.

Table 1. Adult Mallard trapped at Abberton, Essex, in the period 11th June—30th September, in the years 1958 to 1960. Grouped by 10- or 11-day periods in each month : I = 1st-10th; II = 11th-20th; III = 21st-30th or 31st.

	June II	June III	July I	July II	July III	Aug. I	Aug. II	Aug. III	Sept. I	Sept. II	Sept. III	Total
Males												
flightless	0	13	16	7	6	4	2	0	0	0	0	48
flying	16	17	10	10	1	3	8	4	3	0	3	75
	16	30	26	17	7	7	10	4	3	0	3	123
Females												
flightless	0	1	3	2	2	8	9	3	9	2	0	39
flying	2	4	1	4	2	11	7	11	4	1	7	54
	2	5	4	6	4	19	16	14	13	3	7	93

Among the males the latest flying on old feathers was caught on 10th July. The first flying on new feathers was not caught until 3rd August although some should have been free-flying at least two weeks earlier. The first female with complete new feathers was taken on the same date, 3rd August. The latest female retaining all old flights was taken on 19th September : if recaptured later, this must have provided an example of a flightless female in October.

Millais made the remarkable assertions that the female " should she commence to moult (as she occasionally does) before the young can take care of themselves, she does not generally moult all her quills simultaneously, as the males do, but casts them unevenly or alternately, retaining a sufficiency of intermixed new and old primaries to support her in her flight " and " . . . as a rule, many females can fly throughout their moult." These statements have not been confirmed by later workers. In 1960 care was taken to record whether ' flying ' birds caught at Abberton had new or old flight feathers. No females with a mixture of new and old were found.

At Slimbridge ducks are usually caught for ringing in the decoy, which is not operated in June and July and is in any case unsuitable for catching birds unable to fly. But in several years attempts have been made to round-up flightless birds living in the pens surrounding the decoy, among the captive collection. Because such round-ups disturb the captives, few have been attempted and only in two years, 1955 and 1959, was much success achieved. The drives were arranged at times when the numbers of flightless Mallard were thought to be high, in late June and the first half of July, and yield nothing on the spread of the moulting period, but the results are of some interest, since the numbers of ducks caught are relatively large.

Table 2: Sex-ratio in flightless adult Mallard rounded up at Slimbridge. Gloucestershire, in June and July, 1955, 1957 and 1959.

	Slimbridge			
	June III	July I	July II	
males	135	64	31	230
females	9	11	13	33
	144	75	44	263
males : 1 female ..	15.0	5.8	2.4	
(Abberton	13.0	5.3	3.5)	

Table 2 shows that the sex-ratio in catches in each of the three relevant time-units correspond quite closely to those in the Abberton catches at the same times. The larger numbers caught in June III compared with July I and July II may be a consequence of differences in the numbers of ducks present, or in driving success, from year to year, rather than an indication that the onset of flightlessness is earlier at Slimbridge than at Abberton.

The most useful contribution of the Slimbridge round-ups to knowledge of the moult results from the fact that a high proportion of the birds caught had been ringed previously. Some of them had been identifiable as birds of the year when first marked and the captures include enough males of known age to test the hypothesis that males of different ages become flightless at different times (Table 3). Small though the numbers in each category are,

it is possible to assert with some confidence that they show males of one and two years old to be proportionately more frequent in the June catches, suggesting that they had tended to become flightless ahead of the majority of older birds.

Table 3: Numbers of flightless male Mallard of different ages caught at Slimbridge in June and July.

Age	Caught			
	June III	July I	July II	Total
1 year old	11	4	2	17
2 years old	9	1	3	13
3 years old and more	11	12	14	37
Total	31	17	19	67

There is no evidence of a difference between one-year-olds and two-year-olds; larger samples, and means of correcting the numbers found to allow for differences in the numbers available from each year-class would probably be needed to show whether any difference really exists. Explanation of earlier moulting by younger birds must at present be speculation. It may be guessed that it is not simply a function of age. In the unusual circumstances of Slimbridge, where from about 1955 to 1959 the population attempting to breed was at a very high density by British standards and probably too great for the capacity of the place, it may have been that a high proportion of the younger males were unsuccessful in breeding and so went into wing moult ahead of older more successful individuals. But local conditions may not have been important, and further studies of the situation are desirable.

It is unfortunate that females of known age that were caught (12 yearlings and 10 two years old or more) were so few that no age-difference could be established. Experimental study of the relation of the onset of the wing-moult to breeding success and to age seems to offer the best prospects for advance in this and in the related field of the timing and duration of the male eclipse plumage.

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