

## COURTSHIP BEHAVIOR OF THE BLACK DUCK

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REFERENCES in the literature concerning courtship behavior of the Black Duck (*Anas fulvigula rubripes* Brewster)\* in autumn and winter are few and are usually confined to a brief statement that courtship does occur (Townsend, 1916:9). There is a larger literature relative to courtship in spring (Sawyer, 1909:195-196; Townsend, 1916:13-15; Phillips, 1923:80; Bent, 1923:51). These descriptions emphasize the spectacular courtship flight rather than courtship behavior on water or land.

My observations on courtship of the Black Duck in autumn were made chiefly after 1939; on courtship in winter, 1925 to 1933 and 1941 to 1945; on courtship in spring, 1929 to 1933 and 1939 to 1945. Observations previous to 1933 were made in central Ohio (principally Buckeye Lake) and on marshes bordering Lake Erie from Sandusky to Toledo, Ohio. Most of the observations after 1939 were made about South Bass and Starve islands, Ottawa County, Ohio.

## METHODS OF DETERMINING SEX AND AGE

Sexual dimorphism is slight in the Black Duck. The sex of the live bird is recognized chiefly by slight differences in color of the upper bill, in shape and size of head and body, in actions, and in voice.† The bright yellow bill of the adult male, with darker mottling confined largely to the culmen, is quite distinctive. In the adult female the upper bill is a duller, more greenish, yellow and more mottled with olive, especially on the sides. The color of the bills of some adult females is rather similar to the color of the bills of some young birds, particularly young males in October and young females in November or December. It is therefore not possible to determine the age or sex of these birds by bill color alone. Many adult males appear to be notably more thick-set in profile. In some males the bulky head seems a full fourth larger than the heads of their accompanying females. The apparent size of the head is increased at times by fluffing out the feathers, especially about the crown and cheeks. The neck in males often appears to be considerably thicker than in females. The larger over-all size of the males is often evident. Weights of 14 adult males taken between September 27 and December 8, ranged from 2 lbs. 8 oz. (1,034 grams) to 4 lbs. 1 oz. (1,843 grams); weights of 12 adult females ranged from 2 lbs. 0 oz. (807 grams) to 3 lbs. 1 oz. (1,289 grams). With few exceptions adult males in autumn weighed more than 2 lbs. 10 oz. (1,572 grams), the females less.

\* The nomenclature followed in this paper is that which was proposed recently by Delacour and Mayr (1945).

† I was surprised, however, at the degree of certainty and the rapidity with which I could accurately identify the sex of adults and at what great distances. I was forced to presume, then, that the birds themselves had little difficulty in recognizing the sex of one another. I concluded that marked sexual dimorphism in ducks, as a means of rapid sex identification, may have little significance.

The courting actions of the birds, either flying or on water or land, are indicative of their sex, if observed for any length of time. Sex identification is greatly aided by differences in voice. The male grunts softly, rather than quacks, or more rarely gives a whistled note, whereas the female distinctly quacks in varying degrees of loudness.

The sex of the young of the year can be recognized less readily and with less certainty. The color difference in the bills of the sexes is less pronounced, although bills of males usually contain more and brighter yellow and less olive-green at any period of autumn than do those of the females. There is less difference in size between sexes. Ten young of the year, taken in autumn, averaged about 10 oz. (284 grams) less than the adults, with considerable overlapping in weight between young males and young females.

The color of the foot was a reliable character only in adult males in the hand. I have found that the adult male foot as portrayed by Shortt (1943: plate) is correct for fall and winter, except that in some males the red is more orange. The adult female foot in fall and winter contains considerably more reddish-orange on the average than does the adult female foot as portrayed by Shortt. I have never seen a juvenile male's foot in autumn so uniformly orange-yellow as that shown by Shortt; usually there is more olive-green in early autumn, and more reddish-orange after October, with the olive-green restricted mostly to the tarsal ridges and the joints. The foot of the juvenile female was never so uniformly and palely flesh-colored as that figured by Shortt, but contained a large amount of olive-green with a flush of orange-yellow, especially in cold weather.

The autumn adults, particularly males, are locally known as Big Winter Blacks (or Mallards), Red-legged Blacks (or Mallards), or Hudson Bay Mallards. These adults fit Brewster's description (1902: 184-185) of *rubripes*. The autumn juveniles, particularly females, are locally known as Little Black Mallards, Gray-legged or Green-legged Black Mallards. They fit Brewster's description (1909:176) of *tristis*. The sportsmen of northern Ohio use the same criteria for separation of the two supposed kinds as do the sportsmen at Buckeye Lake (Trautman, 1940:178-179).

At various times between 1943 and 1945 I shot seven adult males, three juvenile males and eight adult females after first identifying them as such; of three birds I identified as juvenile females and collected, two were juvenile females, the other a juvenile male (Oct. 3, 1945).

Sex and age determinations of birds collected from September 27 to December 8 were verified through examination of the gonads, the bursa of Fabricius, presence and size of penis, condition of tail feathers (all as outlined by Kortright, 1943:31-36), and feathers from the sides of the chest (Kortright, 1943:161-162). The size of the testes of juvenile and adult males overlapped considerably, as did the size of ovaries of juvenile and adult females. The testes of adult and young

males ranged from 4 to 10 mm. in length, were smallest in late September and October, and began to increase in size after December 1. The ovaries of adult and young females ranged from 3 to 11 mm. in length, and the largest were recorded in December.

#### METHODS OF OBSERVATION IN AUTUMN

My observations were made from the windows of our house on South Bass Island, at other places on the island, and from Starve Island. A blind, with or without wooden decoys, was used upon many occasions. At Starve Island I usually squeezed into a crevice in the limestone bedrock, with a limestone-colored tarpaulin in front of me. Observations were made at every period of the day, but chiefly during the first few hours of daylight, and in the evening. Usually the birds were unaware of my presence.

During August, adult and young Black Ducks begin to gather into smaller groups at such undisturbed localities as Starve Island. By late September as many as 100 Black Ducks may be seen about Starve or Ballast islands, and particularly in their lee during high winds and seas. Their numbers increase during early October, and on some days of that month as many as 800 may be seen in the vicinity of Starve Island. In late November and early December, coincident with the first freezing over of the extensive marshes along the shores of the mainland, there occurs a sharp rise in numbers, and as many as 1,200 have been counted as they sat upon the water. These birds disappear with the first freezing over of the waters surrounding the islands. After that, only an occasional straggler is seen until the first prolonged thaw in late winter or early spring, and the resultant appearance of open leads or holes in the ice.

Black Ducks often comprise over 90 per cent of the river, or surface-feeding, ducks in the flocks about the island. Occasionally as much as 30 per cent of the larger flocks in September and October may consist of Baldpates (*Anas americana*) and Pintails (*Anas acuta*); in November and December, of Pintails and of Mallards (*Anas platyrhynchos*). Invariably the Black Duck has been in the majority in the larger flocks. Red-breasted Mergansers (*Mergus serrator*) and Common Golden-eyes (*Bucephala clangula*) are very numerous at times in autumn, occurring in flocks of 6 to 800 individuals, but they do not habitually associate with the river, or surface-feeding, ducks.

Throughout autumn, but especially in late autumn, solitary pairs of Black Ducks were found about isolated sections of South Bass Island, including the bay in front of our house. Their daily routine usually followed the same general pattern. A pair would alight several hundred feet out and cautiously swim shoreward, taking as much as an hour to reach shore. Then they usually began feeding upon *Cladophora* and other algae which grew profusely upon the limestone bedrock and larger glacial boulders at or slightly below water level. The birds pulled large mouthfuls of algae and ate with seeming greediness for about 15 min-

utes, after which they stood on the beach, sat on large boulders protruding above the water, or swam about near shore. Courtship behavior began sometimes during this routine and became more marked after the birds had eaten, if it was not very cold or windy.

If not molested, a pair of birds, recognizable with fair certainty by differences in size, color, and behavior, visited the same area daily, appearing at about the same time of day and following the same routine. Many pairs of birds were observed at several localities during the autumns of 1944 and 1945.

I also watched pairs of Black Ducks which were with flocks, the flocks ranging in size from 6 to 800 individuals. In the larger flocks, 10 to 31 pairs have been observed courting at some time during a three hour period. A pair could be recognized readily because they flew and alighted close together, and almost invariably remained together. In these flocks were also many adults that gave no indication of courting.

#### AUTUMN COURTSHIP

Courtship, both of solitary pairs and of pairs with flocks, first became apparent by the increased speed in swimming of the male, or of both male and female. The bird or birds swam rapidly a short distance, then changed direction. Frequently they partly opened their wings and splashed the water, and rarely one or both dove. If the pair was with a flock, these actions sometimes greatly excited the other members so that several males pursued the female for short periods, or other pairs began courting. Usually the courting pairs swam to the edge of the flock where there was less interference from the other birds, particularly males. At the beginning of courtship the heads of both males and females were held close to the body, but shortly thereafter, first one (usually the male), then the other began to raise and lower its head in a rapid and jerky fashion, bobbing at intervals during as much as two hours. When the neck was fully extended the bill would be held horizontally, but often when the head was lowered, the bill tip was submerged. Frequently the bill was rapidly flipped upward from the water, throwing up or outward small drops or jets of water. This bobbing of heads, particularly of the males, was the most frequent action of autumn courtship behavior, and with many of the pairs under observation courtship went no further. When courtship progressed further the male became more active; in addition to head bobbing he would swim rapidly toward the female and attempt to bump her side, or peck at the feathers of her neck, back, or rump. Both sexes occasionally flapped their wings vigorously, often treading water and assuming an almost vertical position.

When the female was hard pressed by the male she arose and flew a short distance, less than 300 feet. The male followed; then overtaking and flying over and in front of her, he would stretch his neck downward and at the same time widely spread his tail. As he flew over her the

whitish under-wings were very conspicuous. Occasionally a spirited chase occurred, the female appearing to attempt escape by vigorous use of wings and feet upon the water's surface, similar to the action of a Coot (*Fulica americana*) in rising from the water. Such a chase was conducted with great splashing of water and many abrupt turnings.

Sometimes, after courting for a few minutes to as much as three hours, the female began to swim rapidly with head and neck outstretched on the surface of the water and with body partly submerged, whereupon the male pursued her, his neck outstretched. When the male came close to the female she generally submerged until only the crown of her head and dorsal ridge of her bill was above water, whereupon the male swam over her and copulation seemed to take place. After emerging, the female shook herself vigorously, flapped her wings, twitched her tail from side to side, and began to preen. Generally the male flapped his wings, twitched his tail from side to side, and sometimes bobbed his head and uttered his whistle-like note.

Autumn courtships were much less noisy than those of spring. The male infrequently uttered a soft, low grunt, usually accompanied by head bobbing. He rarely gave the whistled note, and only when seemingly greatly excited. The female would sometimes make a grunt-like quack, but seldom loudly. This subdued use of voice in autumn may have been part of the extreme wariness of the birds during the hunting season.

The entire courtship performance, followed by the copulation behavior, was observed upon 9 occasions: 1 in late September, 2 in October, 4 in November, and 2 in December. The copulation behavior occurred on rather warm days, where there was comparatively little wave action.

Until 1945 I considered fall courtship as a chance occurrence between two birds. But especially after observing solitary pairs of presumably the same individuals visit the same area daily for as long as two weeks, and my surprising experiences on December 8, 1945, I have begun to wonder if actual pairing may not sometimes take place in late fall or early winter rather than in early spring. On December 8, I was in my blind on Starve Island with 15 wooden decoys in the water in front of me. An estimated 1,200 Black Ducks were scattered in flocks about the island. Eventually many birds, including several courting pairs, swam in among the decoys. Presently I observed a pair in copulation behavior. Without exposing myself, I shot the female after the birds had separated. All of the ducks immediately rose into the air except the male that had courted and copulated with the female. He first swam toward the dead duck, then when almost touching her he turned and swam away. I left the blind and walked toward the male, which to my astonishment first swam away about 30 feet then returned to the dead female. I shot the male to verify my identification of them as adult male and female. Later, another pair began to court; I shot the male, and the female remained in the water, whereas all of the other

ducks flew away. She swam away only when I left the blind and walked to the shore.

These experiences brought to mind the discussions I have heard among duck hunters as to why one or more birds from a flock of ducks as cautious as Blacks, Mallards, or Pintails, will return to swing around the decoys or even alight among them after one or more of the ducks has been shot. The opinion of the duck hunters was that the birds were greatly confused ("rattled," they called it) and instinctively returned to the supposed safety of the wooden decoys. Can it be that the returning and supposedly confused duck is the remaining member of a pair from which one has been shot?

Pair formation among unpaired swans and geese apparently occurs in fall or early winter (Delacour and Mayr, 1945:8-9), and geese presumably pair for life (Witherby, *et al.*, 1939:182; Bent, 1925:205). Phillips (1916:24-27) discusses the habits of Canada Geese (*Branta canadensis*) during migration over favorite flight lanes in Massachusetts. These geese are tolled within gunshot through an elaborate system of live and wooden decoys. The geese are exceedingly wary so long as none of their number has been wounded or killed. After being shot at, if one or more of their number remains on the water, one or more members of the flock usually returns to alight upon the water. They have lost their former caution and can be approached in a boat and shot. Their reaction is surprisingly similar to that of the survivors of the two pairs of Black Ducks of December 8.

Many of the Black Ducks in the flocks were obviously young of the year. Courtship among these juveniles was less frequent and less sustained than among adults, and young birds seldom attempted copulation. Courtship among the young of the year appeared to consist principally of splashing and dashing about, first toward one bird and then another. They only occasionally indulged in repeated head bobbing. My observations are not entirely in agreement with those of Hochbaum (1944:21) who, in discussing the habits of other species of ducks, relates that "in fully-grown young birds the full repertoire of displays is offered" and that he has seen "captive young Canvasback [*Aythya valisineria*] and Redhead drakes [*Aythya americana*], still wearing the juvenal plumage, repeat one action after another without pause. A captive Baldpate male began to display in mid-November, when he was little more than four-months old."

#### WINTER COURTSHIP

I watched winter courtship chiefly when the birds were congregated in the open holes of ice-covered lakes and streams. At that season any courtship display that was observed consisted chiefly of groups of birds chasing each other, splashing and swimming rapidly about, with some head bobbing and short display flights. Townsend (1916:13-14) and Phillips (1923:80) describe this chasing and milling about which seems to be so common in winter. I have repeatedly noted that several

birds, presumably all males, pursued a single female, and sometimes one male in the group appeared to be chiefly concerned with driving off other males rather than pursuing the female. Upon a few occasions I have seen a female and guarding male fly away from the group together, giving the impression that the two were paired. Sometimes the milling birds seemed to be chasing whichever bird came nearest to them, regardless of sex, and then the milling and chasing seemed to be play rather than courtship. During the winter, no attempts at copulation were observed. Courtship behavior was most frequent on warm sunny days.

#### SPRING COURTSHIP

Between 1941 and 1944, the pair of Black Ducks (probably the pair which remained to nest near our house on South Bass Island) first appeared between March 8 and 23 (average date March 16). They always appeared during the first prolonged thaw in which open leads were present in the ice-cover of the lake. In 1945, during a phenomenal warm period in February, a pair was noted on February 16 in water that had collected in a depression in the ice-cover. They remained a few days until a cold snap froze the pool in the depression; then they disappeared. Thereafter and until March 16, a pair, presumably the same birds, visited the bay daily, remaining only a short time if the bay was ice-covered, or staying all day when there was open water.

When open water became permanent the pair of birds remained on the lake throughout the day, going at dusk to the neighboring lawns and meadows to feed. From the time of their arrival until the disappearance of the ice-cover in the last half of March, the male was very attentive, almost constantly following the female. There was rapid swimming, chasing, and considerable bobbing and swaying of heads. As the season advanced, the flight display became more elaborate and prolonged, and both birds became more vociferous, the female quacking loudly and persistently. If other males appeared, an animated chase of the female ensued, and obviously her mate attempted to keep other males from associating with her. If other females appeared, she would quack persistently and loudly.

By early April the courting actions of the pair began to change. The female disappeared daily for periods that steadily lengthened until finally she was present on the water only at dusk in the morning and evening. When she was absent the male remained on the water or sat upon a boulder near shore. Toward evening he showed considerable excitement, swimming back and forth and frequently grunting. When she appeared (always from the direction in which I believed or knew her nest to be), she alighted upon the water near the male and almost invariably drank. The male displayed great excitement, bobbed his head, grunted, and swam toward her, bumping her in the side, or trod water while he stood vertically and flapped his wings. He sometimes gave a whistled note as described for the Black Duck by Phillips

(1923:80), for the Mallard by Witherby *et al.* (1939:232-233). Shortly after drinking, the female began to quack; then both birds sprang into the air, and the spectacular spring courtship flight began. By mid-April, courtship displays upon the water had become less frequent, whereas the length and intensity of the courtship flights had notably increased. The longest flights, of 5 to 25 minutes in duration, occurred between sunset and dark. If the flights took place over water, the grunting male pursued the loudly quacking female, displaying before and above her, nipping at her back and tail with his bill, and always attempting to force her down upon the water. When forced down she usually tried to escape by splashing, dodging, diving, and again rising into the air. When she finally remained on the water, she would partly dive or submerge with neck outstretched and only the upper half of her head and bill exposed; the male then swam over her, and copulation took place. After copulation both birds usually bobbed or swayed their heads, the male whistled, and both began to preen and flap their wings, after which they flew to the meadows to feed.

Some of their most elaborate flights occurred over land and were best developed in late April or May. In 1942 these flights continued after April 29, when the clutch of 9 eggs had been completed, and they continued during most of the incubation period until May 15. In these flights the female, often closely followed by the male, flew from a few feet to 30 feet above the ground, sometimes having to rise to clear a fence, often quacking loudly and persistently, and seemingly attempting to see how closely she could come to some object without a collision. Our backyard had many electric and telephone wires crisscrossing above it, several Norway maple trees, a garage, and shed. The female, either with or without the male, would fly among the wires, trees, and buildings, and sometimes between two wires, one of which was a foot above the other. Probably this flight, when conducted late in the season, has no courtship significance. I have seen both female Black Ducks and female Carolina Wood Ducks (*Aix sponsa*) performing without a consort. After the flight the female, and male if present, would alight in the neighboring meadows. There I observed them eating insects and grazing upon the new vegetation; then the female flew away in the direction of the nest. During the latter part of the incubation period the female appeared to resent the presence of the male. At such times she rose high in the air and, if he followed her, continued flying on a straight course until he left her and returned to his loafing area. Thereupon she descended below tree top level, returned, and continued exercising over land, but not in sight of the male. The male left the area when incubation was far advanced.

Black Ducks in spring became surprisingly noisy and fearless, and flew within a few feet of me when I was in the garden or even when I was cutting grass with a noisy lawn-mower. When I was in a boat they conducted their courtship within 30 feet of me, or the male remained standing upon a boulder even when I cast a fly within a few feet of him.



There was little competition between males or pairs in spring on South Bass Island, and one seldom saw more than one male pursuing a female. This lack of competition may have been caused by isolation of the pairs, for the Black Duck nesting population on the island was small and scattered. This condition did not hold in the marshes of the adjacent mainland where the nesting population was denser. During the spring of 1932 I observed the courtship behavior and nesting of Black Ducks in those marshes, and then repeatedly saw more than one male in pursuit of a female. There also I saw males of other species, such as Mallards and Baldpates, in pursuit of female Black Ducks (Trautman, 1940:128-129).

#### SUMMARY

Autumn courtship was principally confined to displays upon the water, such as head bobbing and short display flights. Both sexes, but particularly the females, were rather silent. They were exceedingly wary and ceased to court if alarmed. Occasional pairs were observed copulating.

Winter courtship in open holes in otherwise ice-covered bodies of water consisted primarily of splashing, milling, and dashing about, sometimes with many males in pursuit of a female, or in a sort of play where every bird seemed to chase his neighbor.

With the appearance of open water in spring, pairs of Black Ducks appeared near their nesting sites. Early spring courtship was similar to autumn courtship until the time the female began to leave the male for portions of each day. After that, courtship was primarily confined to flight displays over water, sometimes ending in copulation. After egg laying had presumably begun and in the earlier days of incubation, courtship flights were confined to dusk and were principally over land; these flights were later continued by the female without the male. Throughout spring the pairs were quite fearless and were very vociferous when courting.

About South Bass Island, many adult Black Ducks were in pairs throughout autumn and until they left the region. The male of a pair courted persistently; sometimes courtship ended in copulation. Observations in winter, made chiefly in central Ohio, indicated that pairing was at a minimum during the coldest weather. But most of the ducks were in pairs, even when in flocks, upon returning to South Bass Island in late winter and early spring. The pairs that remained about the island to nest chose a territory and spent as much time in it as climatic or other conditions permitted. The male left the female and territory after incubation was well advanced.

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