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CORRELATION OF BILL AND FOOT COLORING WITH AGE AND SEASON IN THE BLACK DUCK

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SPORTSMEN and ornithologists have long been familiar with two distinct types of coloration in the bill and feet of the Black Duck (*Anas rubripes*), and many have published their interpretations (Brewster 1902, 1909, 1910; Townsend 1905, 1912; Dwight 1909; Phillips 1920; Bent 1923; *et al.*). Some believed that the differences were due to age and to seasonal changes; others that the variants represented two geographic races. In the present A.O.U. Check-List the latter interpretation is accepted.

The greatest difficulty in ascertaining the significance of this color variation has been in making an exact age determination for individual birds. Young birds, once they had moulted from the juvenile to the first winter (or nuptial) plumage, were not distinguishable from older birds. This difficulty was overcome by Gower (1939), who found that the bursa of Fabricius was an age indicator. This sac-like organ is attached to the dorsal side of the large intestine and opens into the cloacal chamber near the anus. It is believed not to be present in adult birds except in the ostriches, but is present in all juveniles. Apparently

PLATE 1. BILL AND FOOT COLORING OF THE BLACK DUCK

DOWNY: ♂ June 6, 1942, Kabiskaubakau River, Ontario (west coast of James Bay). The sexes appear to be essentially alike.

JUVENILE (FLIGHTLESS): ♂ July 15, 1942, Fort Albany, Ontario (west coast of James Bay). Much down still adhering to back and rump.

♀ July 9, 1931. Laird, Algoma District, Ontario. Much down still adhering to back and rump.

JUVENILE (IN JUVENILE PLUMAGE): ♂ July 23, 1942, Big Piskwanish, Ontario (west coast of James Bay). Fully feathered and flying.

♀ September 17, 1941, Rice Lake, Ontario.

JUVENILE (IN FIRST WINTER PLUMAGE): ♂ December 1, 1941, Long Point, Lake Erie, Ontario.

♀ December 1, 1941, Long Point, Lake Erie, Ontario.

ADULT (IN WINTER PLUMAGE): ♂ November 30, 1941, Long Point, Lake Erie, Ontario.

♀ December 1, 1941, Long Point, Lake Erie, Ontario.

ADULT (IN ECLIPSE PLUMAGE): ♂ July 19, 1942, Nettichi River, Ontario, (west coast of James Bay).

♀ July 16, 1942, Nettichi River, Ontario, (west coast of James Bay).

(Note reversion to juvenile coloration.)

It should be remembered that there is considerable individual variation in the bill and foot coloring of this species. The illustration does not show these variations but rather is an attempt to portray the typical sequence of color change. The types of coloration shown are those most frequent in the series of freshly killed birds available for examination.



DOWNY



♂ JUVENILE (FLIGHTLESS) ♀



♂ JUVENILE (IN JUVENILE PLUMAGE) ♀



♂ JUVENILE (IN FIRST WINTER PLUMAGE) ♀



♂ ADULT (IN WINTER PLUMAGE) ♀



♂ ADULT (IN ECLIPSE PLUMAGE) ♀

W. S. Hart

BLACK DUCK
(Anas rubripes)

this sac, after complete development, is gradually absorbed and has disappeared entirely by the time a bird is sexually mature. In surface-feeding ducks the bursa appears to reach the height of development when the bird is approximately four months old, that is, in September or October. It is evident in all juveniles through November and December, is usually still discernible in February, sometimes in early March.

Hochbaum (1942) subsequently studied and further simplified age and sex determination by cloacal examination. Particularly useful is the comparison of the short, rudimentary penis of the juvenile male and the large, sheathed organ of the adult. The oviduct of the juvenile female is occluded; that of the adult shows as a conspicuous slit in the left cloacal wall.

Pirnie (see Kortright, 1942: 170) made a careful study of the Black Duck and came to the conclusion that the variations in color of the unfeathered parts were due to sex and age. He pointed out that the coloration of the bill and feet was duller when adults were in the eclipse plumage than when they were in winter or nuptial plumage.

In the light of the information contained in the papers mentioned above, 38 Black Ducks taken in various places in Ontario have been critically examined. The colors of the unfeathered parts were carefully noted in relation to age, sex and seasonal variation of plumage.

Twenty-seven of these birds were in winter (or nuptial) plumage, having been taken in late November. By cloacal examination 16 were determined as males and 11 as females. Of the males four lacked any trace of the bursa and possessed the large sheathed penis of the adult. The remaining 12 had the bursa well developed (measuring 20 mm to 28 mm in length), and the copulatory organ of each was inconspicuous and rudimentary. These were obviously birds of the year which had just attained their first winter plumage. There was no trace of the more streaked juvenile plumage, and the only outward manifestation of immaturity was the presence of two juvenile tail feathers in each of two birds taken on November 30, 1941. These tail feathers were readily identified as of the juvenile plumage by the blunt tips of the shafts, which protruded some distance beyond the distal barbs, as described by Witherby (1924:270).

The bill coloration of the adult males was from Wax Yellow¹ to Lemon Chrome, faintly tinged with Olive at the base and on the terminal portion. The feet were red, ranging from Coral-Red to near Scarlet-Red. The other group, comprising the first winter males, showed bills varying in color from Light Yellowish Olive to Greenish Yellow and feet of Tawny to Apricot Orange.

In four of the 11 females examined the oviduct was visible and open, and the bursa had been absorbed, indicating maturity. The other

¹ Capitalized color names are from Robert Ridgway's "Color Standards and Color Nomenclature." Washington, D. C. 1912.

seven displayed well-developed bursae, approximately the same size as those found in the young males. The oviduct opening was not visible. Here again there was a difference in the colors of the unfeathered parts, though there was more variation, and the birds were not so readily separated into two groups. All of the bills were spotted and blotched with dusky and exhibited a gradual range from Deep Olive to Ochraceous-Orange. The feet varied from dusky Olive-Brown to Jasper Red. The four adults, however, were those with the reddest feet and most brightly colored bills.

It will be noted that the bill and foot colors of the adult and juvenile birds agree entirely with the respective characteristics attributed to the supposed races, *Anas r. rubripes* and *A. r. tristis*.

Further evidence tending to refute the existence of the two subspecies was obtained during the summer of 1942. Four adult Black Ducks were collected at Nettichi River on the west coast of James Bay between July 16 and 19. It should be recalled that this area is far to the north in the very heart of the range of the supposed red-legged race, *A. r. rubripes*. The coloration of the unfeathered parts of these birds was noted and sketched immediately after the birds were retrieved. Two were males, the first flightless and with body plumage well advanced in the post-nuptial moult. The second was entirely in eclipse body plumage but possessed new flight feathers and was capable of flight. The age of each bird was checked by the cloacal method, and the mature penis and complete absence of the bursa were noted in both. These birds showed a remarkable reversion to the bill and foot coloring of the juvenile male. Their bills were Grape Green in color, somewhat dusky along the ridge of the culmen. The feet in the flightless one were Cinnamon, in the full-winged one Pinkish Cinnamon.

The two females, both birds with broods of young, were in the post-nuptial moult, with wings and body feathers faded and worn and some new eclipse feathers showing on the sides and breast. The coloring of bill and foot in these birds bore a decided resemblance to the juvenile female. The bills were from Court Gray at the tip to Tea Green at the base, with a saddle of Dark Grayish Olive and a few blackish spots. In one specimen the feet were Cinnamon, in the other Tawny-Olive.

Pirnie has demonstrated that the bright coloration of bill and foot is not renewed until October or November, or in other words coincides with the acquisition of the new winter, or nuptial, plumage.

The facts as presented above appear to leave little doubt that *Anas rubripes tristis* and *A. r. rubripes* are one and the same.

In addition to the specimens mentioned above, I have critically examined seven birds in the streaked juvenile plumage. A juvenile male (July 15) which still possessed much down on the back and rump and was incapable of flight, had an Olive-Brown bill, pinkish at the base of the lower mandible. The feet were Benzo Brown. The bills of four

females of similar age were Dark Olive; the feet were as in the male.

A juvenile male, fully feathered and flying, which was taken on July 23, 1942, at Big Piskwanish, James Bay, had the bill varying from Mineral Gray at the tip to Gnaphalium Green at the base with an area of dusky along the ridge of the culmen. The feet were Pinkish Cinnamon. A juvenile female of the same age had the bill mostly Dark Olive, but Tea Green at the base with some dusky spots.

The downy young of both sexes have the upper mandible and base of the lower, Deep Olive-Gray. The nail and lower mandible are Pinkish Buff. The feet are Chamois to Cream-Buff, variously mottled with Buffy Olive and Olive-Brown.

The Black Ducks which may be seen in the hunter's bag in southern Ontario may be described as follows: In the early part of the season will appear streaked juveniles, with greenish bills and Tawny feet, and moulting adults still in partial eclipse plumage, with bills and feet closely resembling those of the juvenile. Later in the season (late November), the juvenile plumage will have given way to the first winter (or nuptial) plumage, which is practically indistinguishable from the adult winter plumage. In this stage the juvenile may retain the earlier coloring of the unfeathered parts but usually shows a change to a Greenish Yellow bill and Cinnamon feet. The adults at this season have regained the full winter plumage and also the yellow bills and red feet. By spring most of the yearlings have also attained the bright coloration of bill and feet and are indistinguishable from the adult. Some may be somewhat retarded in this respect, but the colors in all are much brighter than in November specimens.

In the course of this study it was thought advisable to check some of the characters which descriptions in the literature commonly ascribe to mature Black Ducks. One statement frequently encountered is that old males have the chin black. Two of the juveniles examined had the black chin, and one adult lacked it, indicating that this marking is not reliable as an age indicator, though it is probably more frequent in adult birds. Another age character is one suggested by Ticehurst (1938), namely that striae are present on the tip of the nail of the bill in young birds but absent in adults. These striae were certainly absent in all adults, but were also absent (or only faintly indicated) in most of the first winter birds, only three having them well-marked. A subsequent examination of skins in the Royal Ontario Museum of Zoology shows this character to be more constant in birds still in the juvenile plumage.

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