

1

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PHOTOGRAPHIC DOCUMENTATION OF BLUE-MORPH ROSS'S GOOSE (*CHEN ROSSII*) ON ASSATEAGUE ISLAND, VIRGINIA. – The blue-morph Ross's Goose (*Chen rossii*) is one of the rarer genetically-determined polymorphisms in birds (McLandress & McLandress, 1979; Mundy et al., 2004). Plumage polymorphism in Ross's and Snow Geese is associated with a point substitution in the *melanocortin-1 receptor (MC1R)* gene (Mundy et al., 2004). The origin of the "blue" allele in Ross's Geese is unknown, but it could have been introduced through

hybridization with Snow Geese or it could have originated as a recurrent mutation of the *MC1R* gene. Blue-morph individuals comprise less than 0.01% of the wintering population of Ross's Goose in California (McLandress & McLandress, 1979) and are similarly rare in the Mississippi and Atlantic flyways where wintering populations have increased dramatically during the past two decades (Ryder & Alisauskas, 1995). Records of blue-morph Ross's Geese east of the Mississippi River have been limited to a few anecdotal reports posted by birders and waterfowl hunters on internet websites and a single peer-reviewed sight record from Assateague Island, Virginia (Graves, 2005). A probable blue-morph Ross's Goose  $\times$  Snow Goose (*Chen caerulescens*) hybrid was later photographed on Assateague Island (Graves, 2007), but photographic documentation of pure blue-morph Ross's Geese in the Atlantic flyway has yet to be obtained.

On 21 November 2007, I photographed a probable blue-morph Ross's Goose in a flock of 2,000+ Snow Geese near the southern margin of Swan Cove Pond on Assateague Island, Chincoteague National Wildlife Refuge, Accomack County, Virginia (Fig. 1). I watched the diminutive goose from a distance of 50-60 m in good to fading afternoon light (15:50-17:00 EST) as it stood or swam in shallow water among white-morph and a few blue-morph Snow Geese. The following description was made from digital photographs taken with a Canon Powershot A570 camera (7.1 megapixels) through a spotting scope set at 20-30X (Swarovski HD-ATS 65).

The Ross's Goose was significantly smaller than the adjacent Snow Geese and had a proportionally shorter neck and rounder, less angular head (Fig. 1). The plumage color pattern was similar to an adult class-6 blue-morph Snow Goose (Cooke & Cooch, 1968), but the black neck plumage extended anteriorly to the throat and up the back of the neck to the crown above the eyes forming a rounded white face patch. The back and breast were black, becoming charcoal gray on the sides, and pale gray on the lower belly and thighs. Undertail coverts were white. Exposed wing coverts were silvery-gray, the innermost secondaries and tertials were similarly colored but with a blackish stripe along the rachis. The small bill was dark pink, purplish-gray at the base, but lacked a black "grin" stripe typical of Snow Geese or Ross's  $\times$  Snow Goose hybrids (McLandress & McLandress, 1979; Graves, 2007). The juncture between the base of the bill and facial feathering was only slightly curved as opposed to strongly arced as in Snow Geese. There was no evidence of ferrous staining on the goose's head.

Discriminating pure Ross's Geese from hybrids may be difficult under typical field conditions.  $F_1$  hybrids



Fig. 1. An adult blue-morph Ross's Goose (*Chen rossii*) photographed on Assateague Island (Chincoteague National Wildlife Refuge), Accomack County, Virginia, on 21 November 2007.

may be identified by their intermediate size and shape and the presence of a thin black grin stripe (Trauger et al., 1971; McLandress & McLandress, 1979; MacInnes et al., 1989). It is not certain whether backcrosses (e.g., Ross's  $\times$   $F_1$  hybrid) can be reliably separated from pure Ross's Geese in the field. In this case, I cautiously classified the blue-morph individual as a pure Ross's Goose because of its (i) small body size, (ii) short neck and rounded head, (iii) small bill with a purplish-gray base, (iv) lack of black grin patch, and (v) rounded white facial patch. The degree of curvature of feathering at the base of the bill is often cited as a character distinguishing Ross's Goose from Snow Goose (Ryder & Alisauskas, 1995). However, there is considerable variation in this character in Ross's Goose. The blue-morph individual on Assateague Island exhibited a slight curve that was well within the range of variation observed in museum specimens ( $n = 32$ ) of presumably pure white-morph Ross's Geese collected in California (pers. obs.; National Museum of Natural History, Smithsonian Institution). The critical field mark appears to be the black grin patch, present in the Snow Goose and Ross's Goose  $\times$  Snow Goose hybrids (McLandress & McLandress, 1979) but absent in adult Ross's Goose. However, geese must be observed under ideal conditions in order to distinguish a thin dark grin

patch, present in F<sub>1</sub> and backcross hybrids, from the shadow produced by the tomium of the maxillary ramphotheca in Ross's Goose.

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