

## BLUE-PHASE ROSS' GEESE ON ASSATEAGUE ISLAND, VIRGINIA

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Plumage polymorphism in the Snow Goose (*Chen caerulescens*) and Ross' Goose (*Chen rossii*) is perfectly associated with a point substitution (Val<sup>85</sup>->Met<sup>85</sup>) in the *melanocortin-1 receptor* gene, which is expressed in the melanocytes of developing feather follicles (Mundy et al. 2004). White geese are homozygous for the Val<sup>85</sup> allele whereas "blue-phase" geese are heterozygous or homozygous for the Met<sup>85</sup> allele. The blue-phase of Ross' Goose was only recently discovered (McLandress and McLandress 1979) and the prevalence of the blue-phase morph on the primary wintering grounds of the species in California was estimated to be less than 1%. The source of the Met<sup>85</sup> allele in Ross' Geese is unknown, but it could have entered the gene pool through hybridization with Snow Geese or through recurrent mutation of the *melanocortin-1 receptor* gene. Populations of Ross' Geese have increased dramatically in recent years (Ryder and Alisauskas 1995) and the species has become a rare winter visitor along the Atlantic coast, usually in the company of Snow Geese. Although the total number of blue-phase Ross' Geese wintering in the Atlantic flyway must be very small, none of the few sighting of blue-phase individuals reported on internet websites or anecdotally mentioned in regional ornithological publications has been adequately documented in a peer-reviewed journal.

On 24 November 2001, I observed a probable family of four Ross' Geese on Assateague Island (Chincoteague National Wildlife Refuge), Accomack County, Virginia. The refuge was unusually dry and thousands of geese arrived every afternoon to drink and bathe at the barrow ditch that parallels the road along the southern margin of Snow Goose Pool. I first noticed the foursome about 80-90 m north of the ditch in a large flock of Snow Geese that covered several hectares. Over the next ten minutes the Ross' group meandered toward the road through the milling Snow Geese and finally reached the ditch no more than 20 m in front of me (1540 EST). I watched them with binoculars (Zeiss Victory 10 X 40) in good afternoon light for another 10 minutes until all the geese took flight in an uproar when a Bald Eagle flew over.

The Ross' group included an adult and a juvenile of each color morph. The four were identical in stature, significantly shorter than adjacent Snow Geese, and had rounded heads and proportionally short necks. The adults had diminutive dark pink bills that lacked the black grin stripe present in Snow Geese. I acknowledged,

however, that a very thin or partial grin stripe might not have been visible with binoculars at a distance of 20 m. Feathers at the base of the bill appeared to form a straight line in all four individuals. This combination of characters suggested that the individuals were pure *Chen rossii* rather than hybrids between *C. rossii* and *C. caerulescens*.

I was transfixed by the novel plumage pattern of the blue-phase adult and devoted the bulk of my observation time taking plumage notes. The goose was similar in appearance to the definitive basic plumage of the Type 6 blue-phase Snow Goose (Cooke and Cooch 1968), but with several important distinctions, most notably the intensity and distribution of melanin on its head, neck, and back. The Ross' neck was entirely black anteriorly to the middle of the crown and to the midline of the throat, forming a broadly rounded white facial patch. The upper breast and back were also black, but slightly paler than the neck. The lower breast, sides, and flanks were dark brownish-gray with paler feather margins. The center of the abdomen and the undertail coverts were white. Coverts visible on the folded wing were silvery gray, the tertials and scapulars were similarly colored but with black stripes along the rachises. The gray tail and white rump and lower back were glimpsed only briefly as the goose took flight. Both adults had dark pink legs.

The body plumage of the juvenile blue-phase individual was uniformly brownish-slate with flecks of white on the face whereas the bill and legs were dark gray. The white-phase juvenile was white with pale gray crown and mantle. The white-phase adult exhibited typical definitive basic plumage. None of the Ross' Geese exhibited rusty ferrous staining on their facial plumage.

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