FEATURED PHOTO

AGEING AND MOLT IN NONBREEDING BLACK-BELLIED PLOVERS

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The correct determination of a bird's age, both in the hand and in the field, can be useful for population studies, and necessitates an appreciation of molt patterns. Like most northern-hemisphere shorebirds, adult Black-bellied Plovers (*Pluvialis squatarola*) undergo a complete prebasic molt from fall into winter, while juveniles have only a partial molt in their first winter. The literature, however, contains conflicting information on the timing and number of molts undertaken by first-year Black-bellied Plovers. Paulson (1995) reported that the post-juvenile molt is surprisingly variable, but typically juveniles replace "most of body plumage ... late Sep through at least early Nov." For the western Palearctic, Cramp and Simmons (1983) noted that Black-bellied Plovers retain their juvenal plumage through autumn migration, into October or November and sometimes later. Byrkjedal and Thompson (1998) noted that postjuvenal molt does not usually start before mid November. The latter two accounts accord with the situation in California, on the basis of our observations at Bolinas Lagoon, Marin County, and 30 juveniles collected in California from mid September through late October (specimens at California Academy of Sciences [CAS]). Starting between November and January—and continuing for an indeterminate period (see below)—a variably extensive molt occurs, starting with the crown, mantle, and scapulars (Cramp and Simmons 1983; pers. obs.). This pattern of molt is reminiscent of certain large gulls, which retain juvenal plumage into winter (Howell et al. 1999, Howell 2001) but which were traditionally believed to have undergone an extensive postjuvenal molt in their first fall (Grant 1986). Some Black-bellied Plovers also replace a variable number of upperwing coverts and tertials from at least January onwards (CAS specimens; pers. obs.).

In their first spring, Black-bellied Plovers in California manifest a highly variable appearance: some have undergone extensive molt that includes 90% or more of their upperwing coverts whereas others have retained most or all of their juvenal upperwing coverts, which are then very bleached and worn. Birds showing extensive molt can be aged by their worn juvenal primaries and any retained juvenal wing coverts and tertials. Some first-spring birds are gray and white overall, resembling basic-plumaged adults, but others have a spattering of black feathers on the chest, belly, and flanks. For example, of 26 CAS specimens collected from central California in May of their second calendar year, 11 have some black on their underparts while 15 lack black; both types are well represented by males and females. Other individuals, perhaps mainly males (observed farther north and later in spring?), can attain mostly black underparts suggesting adults (e.g., University of Puget Sound specimen no. 17217, collected 12 May). The complete second prebasic molt occurs mainly from May to September (its start perhaps overlapping with the last stages of first-winter molt?), after which birds in their second calendar year resemble basic-plumaged adults (Cramp and Simmons 1983, Paulson 1995, Byrkjedal and Thompson 1998).

Thus Black-bellied Plovers undergo variable degrees of molt in their first winter and spring, followed by a complete molt into second basic plumage during the summer and fall of their second year. But how many times does a Black-bellied Plover molt in its first year? Most sources, e.g., Paulson (1995) and Byrkjedal and Thompson (1998), report that first-year birds have a variable first prealternate molt in spring, following their first prebasic molt in winter, with the latter authors noting that this molt is very

limited in extent. Cramp and Simmons (1983) implied that the birds molt directly from "first non-breeding" (= first basic) to "second non-breeding" (= second basic) plumage.

For two molts (and two plumages) to occur, a bird must replace some feathers more than once (Humphrey and Parkes 1959). The data from Cramp and Simmons (1983), plus our field work and specimen examination, suggest that there could be only a single molt in a Black-bellied Plover's first winter, as apparently occurs with large gulls (Howell 2001). Establishing whether there are two or one first-winter molts is problematic. The former interpretation, while possibly true, may in part be a legacy of studies of molt in passerines, in which discrete fall and spring molts do tend to be prebasic and prealternate, respectively. Specimens with extensive molt in midwinter and others with extensive molt in spring suggests that there are two molts—but no individual bird can be followed to prove this. First-spring birds with extensive bright feathering could be those that retained good-quality juvenal plumage longest and then attained a plumage resembling adult alternate; first-spring birds wearing a dull plumage like adult basic could be birds that molted early out of juvenal plumage. Differences in the color and pattern of feathers relate to molt timing and hormonal state of the bird, not necessarily to different molts (Herremans 1999, Howell 2001). Thus later-molting and hormonally more advanced birds could attain black underpart feathers and boldly checkered upperwing coverts in late winter and spring as part of the later stages of a single protracted or suspended first-winter molt.

The pattern of a single first-winter molt in species with definitive alternate plumages was termed the simple alternate strategy by Howell and Corben (2000). It may occur in a variety of species but has not been widely recognized. If Black-bellied Plovers do molt only once in their first winter this molt is phenotypically more similar to a definitive prealternate molt than to a prebasic molt—a characteristic of the simple alternate strategy (Howell and Corben 2000). The difficulty of following individual birds over time and distance has hindered elucidation of this strategy. A confounding factor is that plumage patterns and colors can change during the course of a single molt, and these different color patterns can be mistakenly equated with different molts.

The featured photos on the back cover show two Black-bellied Plovers in winter. The upper bird, photographed in San Mateo County, California, on 8 November 1992, is mostly if not entirely in juvenal plumage, typical of first-year birds at this season. The buff tones of fresh juvenal plumage have faded, and the plumage has become slightly worn. Post-juvenal molt, if it has occurred at all, has been limited. The age of the lower bird, photographed in Santa Barbara County, California, in January 1991, is more problematic. It could be a first-winter bird, perhaps with some molt of the scapulars, which look as though they might be slightly darker (and fresher?) than the paler upperwing coverts. But the primaries look relatively black and fresh, more typical of an adult. The tertial pattern is equivocal but these feathers look relatively unworn; most juveniles by this date have heavily abraded tertials with the pale lateral notches excavated. Adult tertials typically are more muted in pattern, with poorly contrasting pale brownish bands or notches, but some look similar to those of this bird. Alternatively, this bird's tertials may be postjuvenal feathers, although all first-winter specimens we examined at this season had two or more retained juvenal tertials. Until molt timing and extent, and variation in plumage characters such as tertial pattern, are well documented, ageing winter Black-bellied Plovers in the field will sometimes be difficult. And might some birds in second basic plumage be distinguishable?

Much remains to be learned about even our common shorebirds. We conclude that the jury is still out on the question of one versus two molts in first-winter Black-bellied Plovers. Perhaps some individual Black-bellied Plovers do have two first-winter molts while the second molt is suppressed in other individuals. Could such differences relate to the latitude of a bird's wintering grounds? We offer this note to stimulate thought about molting strategies in the Charadriiformes and other nonpasserines. Thanks to

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