

# Ageing and sexing series\*

## Part 4: Ageing and sexing the Dunlin *Calidris alpina*

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### INTRODUCTION

The Dunlin *Calidris alpina* is a widespread and abundant wader species with a circumpolar arctic to north temperate breeding distribution and winters mainly in the northern hemisphere. Currently nine subspecies are recognized, which differ in size and in the colour of the upperparts in breeding plumage (del Hoyo *et al.* 1996). The eastern extent of the breeding distribution of the Dunlin population that migrates through Europe is poorly known; however there is evidence that shows that some birds may originate from as far east as the Taimyr Peninsula which is the breeding area of subspecies *C. a. centralis* (Gromadzka 1985a, 1989). This was confirmed by an analysis of population genetic markers, plumage characteristics and moult schedule of birds caught during autumn migration in Europe (Meissner *et al.* 2005, Wennerberg 2001).

This paper is based on the authors' experience and published sources about Dunlins from subspecies *shinzii*, *alpina* and probably also *centralis*; however at least some of the ageing methods presented may be applied to other subspecies, especially those based on presence of juvenile feathers in first winter or in the second breeding plumage.

### MOULT SCHEDULE

Post-juvenile moult starts as early as mid-July in *C. a. shinzii*, but in the other subspecies about one month later and is finished in November or December. After post-juvenile moult, juvenile median coverts remain and may be visible up to the following autumn, i.e. until young birds are 13–14 months old (Fig. 1).

The period over which the complete post-breeding moult of adults takes place is highly variable. Some individuals start replacing primaries during incubation in June (Holmgren *et al.* 2001), while others begin replacing body feathers and inner primaries during migration, on moulting areas or on the wintering grounds. Primary moult is not usually arrested during migration (Holmgren *et al.* 1993) and it is completed between late August and late November; however there is a great variation in its timing between populations (Cramp & Simmons 1986, Holmgren *et al.* 2001).

Breeding plumage is attained in a partial pre-breeding moult, which starts in late February or March and finishes between early April and late May. Pre-breeding moult involves the head, neck, underparts, mantle and the majority of scapulars (usually except the longest ones), the tertials and also some median coverts.

### AGEING

#### “Adult buff” coverts

The term “adult buff coverts” (AB coverts) was proposed to describe buff-edged wing coverts which can be found in birds older than one year (Clark 1984, Gromadzka 1985b, Gromadzka & Przystupa 1984). This might be a reason for incorrect ageing of this species, especially in winter plumage. Such coverts are similar to those of juveniles. The most striking difference between AB and juvenile coverts is the shape of the dark shaft streak, which is wider towards the feather tip in juveniles and towards the base in adults (Fig. 2). The buffish colour of AB coverts varies in intensity being very pale in some birds, while in others it is a bright rusty-brown. Very

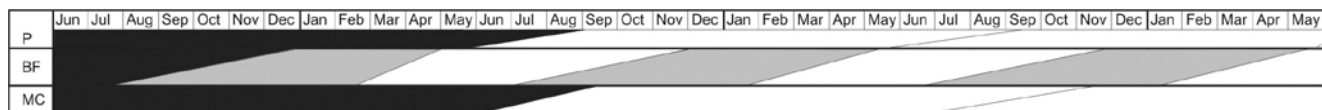
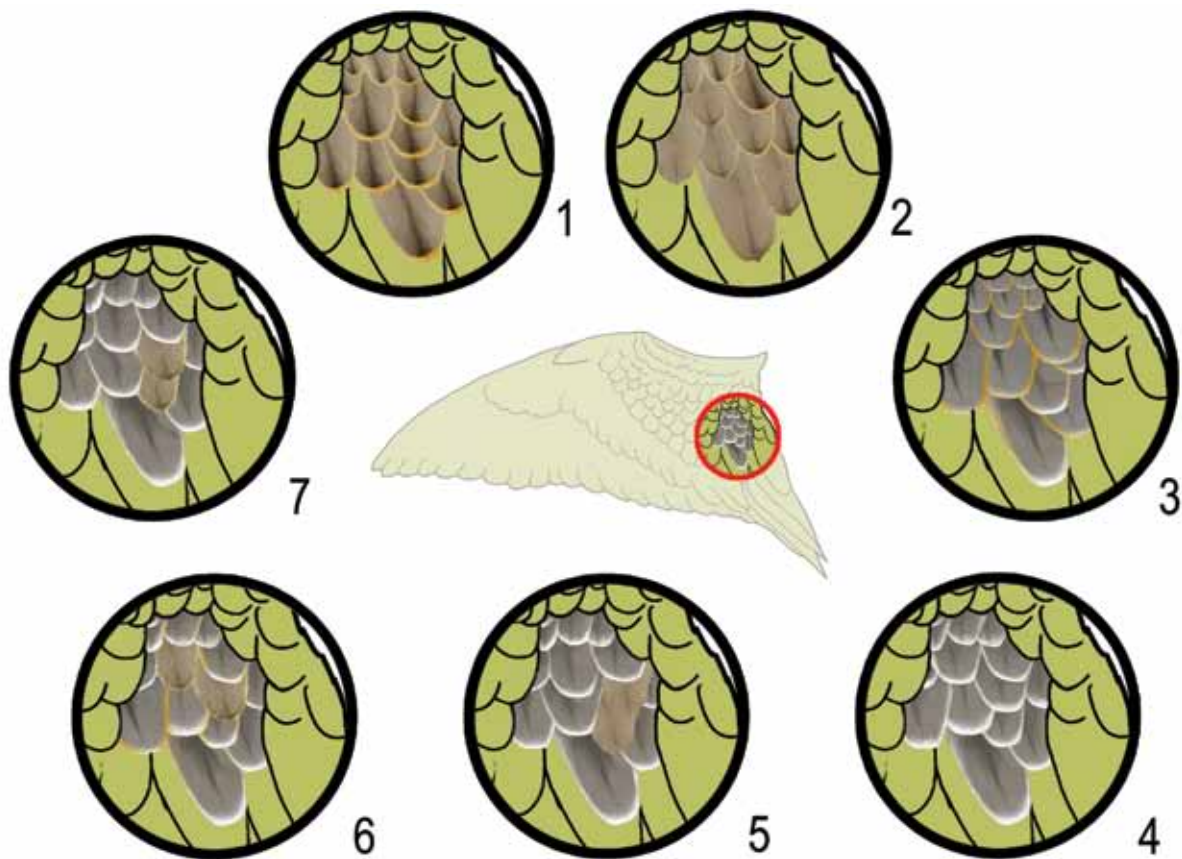


Fig. 1. Moulting schedule of Dunlin. P = primaries; BF = body feathers; MC = median wing coverts; Black = juvenile feathers; grey = non-breeding plumage; white = breeding plumage.

\* This series summarising current knowledge on ageing and sexing waders is co-ordinated by Włodzimierz Meissner (address above). See *Wader Study Group Bulletin* vol. 113 p. 28 for the Introduction to the series.



**Fig. 2.** Inner median coverts of Dunlin: The innermost feathers are exposed for purposes of this drawing, but are usually covered by the outer scapulars. 1. Juvenile in early autumn (fresh juvenile plumage – age 3/HY); 2. Juvenile in late winter/spring (worn juvenile plumage – age 5/SY); 3. Adult AB type (fresh winter plumage – age 6/ASY); 4. Adult grey type (fresh winter plumage – age 6/ASY); 5. Bird during post breeding in late autumn moult with two very worn feathers (age 4/AHY); 6. and 7. Birds during post breeding moult in autumn with worn juvenile and new winter feathers (age 5/SY); drawing 6 shows a bird with old juvenile coverts as well as a mixture of white-fringed and AB coverts. (Original drawings by Michał Skakuj.)

often this colour becomes lighter at the feather tip. Moreover the buff fringe diffuses into the grey central portion of the feather in adults, whereas juvenile coverts have a distinct, rather clear-cut buff terminal band which contrasts with the broad part of the dark brown shaft streak behind.

Most adults with AB coverts caught in the Baltic region during autumn migration have a mixture of median coverts, some with white fringes and some with buff fringes. But some birds have buff fringes on all their median coverts and tertials. At first sight these birds look like juveniles, but the shape of the dark shaft-streak is diagnostic. Therefore this should be examined as a matter of routine.

Analysis of museum specimens revealed that birds with AB coverts were collected mainly on breeding grounds to the east of the Ob River (73°E; Engelmoer & Roselaar 1998, Gromadzka 1989). On the Polish Baltic coast these birds occur more numerous from mid-September, whereas in the Adriatic they appear from the beginning of September (Meissner *et al.* 2005). Engelmoer & Roselaar (1998) suggested that the presence of these coverts is a typical character of the subspecies *centralis* and found that birds with AB coverts are more advanced in primary moult than adults with typical white-fringed coverts. Adults with AB coverts comprised 41 and 35% of birds that had completed their primary moult in the Adriatic and Baltic respectively (Meissner *et al.* 2005). AB coverts appear also in North American subspecies (Engelmoer & Roselaar 1998, Holmes 1966), thus all our remarks about ageing of Dunlin by examination of the inner median coverts may apply to all subspecies.

From late August onwards the precise age of many birds which have the remains of breeding plumage cannot be determined, i.e. they could either be full adults or second calendar year birds. They may have all new white-fringed inner median coverts or a mixture of new and old, very worn coverts (Fig. 2.5), i.e. coverts that are so worn and faded that their original pattern can no longer be seen. Thus it is no longer possible to determine whether the old coverts are adult or juvenile. Any birds still in primary moult that retain extremely worn outer primaries are probably in their second calendar year (i.e. such primaries were originally grown when they fledged and are now 13–14 months old). However, to be safe, they should be aged as “older than 1 year” (*ringing codes: EURING = 4; North American = AHY*).

### Juvenile plumage

Lack of a black patch on the belly, but in some individuals the upper belly and flanks are streaked so strongly, that at first sight this pattern may be similar to an adult's black belly patch. All median coverts and tertials have buffish (sometimes more yellow or rusty) terminal bands. The dark shaft streak is always clearly visible being wider toward to feather tip. The shape of the shaft streak most often looks like a drop, but sometimes takes other forms. However the part of the feather immediately behind the buffish terminal band is invariably dark in juveniles with a sharp demarcation and this is a key character for distinguishing juvenile median coverts, especially from AB coverts (Figs 2.1, 2.2 and 2.7). In late autumn

(Oct–Nov), all juvenile median coverts are slightly worn, while those of older birds are newly-moulted and fresh.

### First non-breeding plumage

Birds gain full winter plumage in their first autumn, but differ from adult non-breeding by presence of retained juvenile median coverts. An additional feature might be primary wear, because primaries in winter are more worn in juveniles than in adults, but it seems that this difference is often slight.

### First breeding plumage

At least one retained juvenile inner median covert is the only reliable criterion. In Europe, however, birds of this age retain most of their juvenile coverts. These are not only very worn, but the buffish terminal band has usually worn away completely, so on most coverts it is difficult to distinguish any pattern. However the innermost median coverts suffer much less wear because they are protected as they are covered by the scapulars. Thus usually they are not nearly so badly worn and can be used for ageing from late winter, when they are the only juvenile coverts that remain, until sometimes Jul–Aug when they are replaced in the next moult. After winter, the primaries of second calendar year birds are much more worn than those of adults. Although this feature seems to be quite a good criterion, it should be used with care because such wear can be very variable. Many second calendar year birds do not attain full breeding plumage.

### Adult breeding plumage

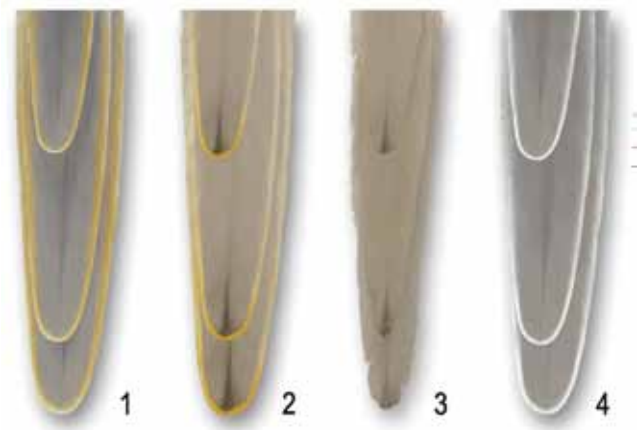
Characteristic broad black patch across flanks and fore-belly. Breast heavily streaked blackish. All back feathers have black centres and wide cinnamon edges. In fresh plumage, median coverts have white fringes, but in some birds, especially from the more eastern parts of the Palaearctic breeding range, these fringes may be buffish (AB coverts) as discussed above (Fig. 2).

### Adult non-breeding plumage

Upperparts plain dull grey; median coverts with white fringes (except any with some or all AB coverts as above). Underparts white with sides lightly streaked grey-brown.

Juvenile-type upper wing coverts remain after the first moult and this makes ageing of first-year birds relative easy (*ringing codes: EURING = 3; North American = HY*) at least until the next complete moult (Fig. 2). However adult and second-year birds with new moulted AB coverts may be erroneously classified as juveniles/first-year birds.

When the fringes of the inner median coverts are worn, the colour of the remaining juvenile coverts can be helpful in ageing. Juvenile coverts are brownish overall while the next generation of winter plumage coverts are dark grey (apart



**Fig. 3.** Tertials of Dunlin. 1. Adult fresh, AB type; 2. Juvenile fresh; 3. Juvenile worn; 4. Adult grey type fresh. (Original drawings by Michał Skakuj.)

from the white fringes). Second calendar year birds in spring and summer have very worn and usually faded primaries. However our experience is that some adults may also show rather badly worn primaries. In Europe up to mid-Aug, it should be safe to age birds with breeding plumage and no juvenile inner median coverts as older than 2 years (*ringing codes: EURING = 6; North American = ASY*) and those with at least one juvenile covert as being second calendar (*ringing codes: EURING = 5; North American = SY*). In addition the primaries of second calendar year birds should be at least moderately worn.

The same age-related pattern of the coverts can also be seen in the tertials (Fig. 3). Although these feathers are worn rather quickly, in some cases they may be a helpful additional criterion.

### SEXING

Males compared to females in breeding plumage have a whiter hind-neck which contrasts well with the darker nape and mantle. In females, the hind-neck and nape looks more uniformly coloured (Hayman *et al.* 1987). However due to individual variation in this pattern, sexing using this feature is probably unreliable. The best measurement for separation of sexes is bill length. However all linear measurements of males and females overlap to a great extent. For example the overlap between sexes in bill length was 10% in adult *C. a. shinzii* from Sweden (Jönsson 1987), and 25% in adult *C. a. alpina* migrating through the Baltic in autumn (Meissner & Pilacka 2008). However, it seems that bill length can be used for sexing birds from particular breeding pairs in which the female is larger than the male (Cramp & Simmons 1987). Discriminant functions have been derived for sexing birds from the *alpina* subspecies migrating through the Baltic in autumn (Table 1). However, it should be remembered that

**Table 1.** Discriminant equations for sexing juvenile and adult Dunlins *C. a. alpina* according to linear measurements.  $D > 0$  identified females whereas values of  $D < 0$  identified males. Data for analyses were collected in the southern Baltic during autumn migration. BL = bill length, TL = tarsus length, WL = wing length.

Age class	Equation	Accuracy	Source
Juveniles	$D = 0.48BL + 0.60TL + 0.13WL - 47.09$ $D = 0.55BL + 0.66TL - 35.51$	In validation sample 100% of males and 81% of females were correctly classified	Meissner 2005
Adults	$D = 0.56BL + 0.37WL - 63.24$	Cross-validation with a jackknife revealed that 100% of males and 97.3% of females were correctly classified	Meissner & Pilacka 2008

there is large variation in the biometrics of Dunlin, even within subspecies, so such equations cannot be applied to other populations without further investigation.

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