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205 Lesser Black-backed Gull / Kleine Mantelmeeuw *Larus fuscus*, third calendar-year, Wijster, Drenthe, Netherlands, 16 April 2001 (*Rik Winters*). Bird showing exceptionally small amount of grey and superficially similar to second calendar-year, but note pale iris, reddish eye-ring and rather variegated pattern on scapulars and coverts. **206** Lesser Black-backed Gull / Kleine Mantelmeeuw *Larus fuscus*, third calendar-year, Wijster, Drenthe, Netherlands, 14 April 2001 (*Rik Winters*). Atypical bird and rather difficult to age but worn non-juvenile primaries indicate third calendar-year rather than second calendar-year, but similar to some second calendar-year *fuscus*. **207** Lesser Black-backed Gull / Kleine Mantelmeeuw *Larus fuscus*, third calendar-year, Wijster, Drenthe, Netherlands, 16 April 2001 (*Rik Winters*). *Intermedius*-type. Note large proportion of plain grey coverts; retained brown coverts, unmarked brown primaries and bare parts coloration age this bird as third calendar-year. **208** Lesser Black-backed Gull / Kleine Mantelmeeuw *Larus fuscus*, third calendar-year, Wijster, Drenthe, Netherlands, 10 June 2001 (*Rik Winters*). *Intermedius*-type. Note overall rather adult-like appearance, but primaries all brown and worn.

ing on whether **1** the bird renewed all primaries starting from p1 (no moult contrast); **2** started moulting at p1 but without finishing the tract (one moult contrast); **3** started moulting at, eg, p5 and moulted the inner four to nine primaries during a second moult wave (one moult contrast); **4** started moulting at, eg, p7, started a second moult wave at p1, but arrested this wave at, eg, p3 (two moult contrasts); or **5** did not moult any primaries during winter.

Pattern 2 seems to be the default for *intermedius* that moult primaries during winter, although 1, 3 and 4 may occur. Pattern 3 seems to be the most common among *fuscus*, and 4 may occur, while 1 and 2 seem unlikely. Most *intermedius* and probably all *graellsii*, however,

do not moult primaries during the second winter at all and thus show pattern 5.

It is usually difficult and often impossible to determine the number of times a primary has been replaced, which means that *intermedius* with a type 2 moult pattern and *fuscus* with a type 3 moult pattern can show a moult contrast at the same location in the wing, even though *fuscus* may have renewed all of its primaries an extra time compared with *intermedius* and the timing of the renewal of the outer primaries may differ by maybe six months.

In the *intermedius* returning with a moult contrast, however, the outer primaries look rather brown and more worn than those of *fuscus*, which can be judged



209 Lesser Black-backed Gulls / Kleine Mantelmeeuwen *Larus fuscus* and European Herring Gulls / Zilvermeeuwen *L. argentatus*, Wijster, Drenthe, Netherlands, 3 June 2001 (Rik Winters). Nominote third calendar-year *fuscus*-type in the centre; note moult contrast between p6 and p7, small mirror in p10 and blackish upperparts. Compare with similarly aged *graellsii*-type behind it on the left.

in the field under reasonable to good observation conditions.

Fourth and later moults

The fourth moult is similar to the second moult: it is a complete moult commenced during the second summer, starting with the inner primary. From the spring of the fourth calendar-year onwards, at least most *fuscus* and *intermedius* have an adult-like plumage, and studying moult becomes progressively difficult. The moult of adults has been described in detail elsewhere (Jonsson 1998, Rauste 1999, Winters 1999 and references therein). The moult of adult *fuscus* is an interesting case. As mentioned, the primary moult of *fuscus* during the first winter is a special case of a partial moult (the first moult). The primary moult during the second winter is, however, a partly postponed complete moult (the second moult), followed by a partial moult (third moult) that usually includes fewer primaries than during the first winter. This shift of the complete moult to the wintering areas becomes even more extensive in adults and may even become complete. The moult of primaries during the first winter is thus best regarded not homologous to the winter primary moult of adults.

Using moult as an identification feature

The details of how moult works are largely unknown. In general, moult is considered to be a flexible process

in evolutionary terms (cf, eg, Svensson & Hedenström 1999, Hall & Tullberg 2003; Lesser Black-backed Gull might be regarded as an extraordinary example in this respect as it unites the extremes within a single species), although the variation observed could possibly be the result of intergradation between populations (cf Helm & Gwinner 1999).

The moult pattern of an individual bird may vary depending on external factors. The photoperiod (the daylight period) is regarded to be the most important proximate factor when the regulation of moult is concerned (Dawson 2002).

I have never found a first-winter 'large white-headed gull' moulting when the photoperiod was shorter than c 10 h. Bert-Jan Luijendijk (pers comm) confirmed that even in the mild climate of the Mediterranean, first-winter Yellow-legged Gulls *L. michahellis* were never observed to show active moult in the wing-coverts during mid-winter, although they apparently continued to moult scapulars at a very low pace. A remarkable observation in this respect was made by Steve Howell, who noted that moult in Western Gulls in California, USA, during mid-winter appeared to depend on the weather being bright or overcast (Howell 2001). Also, colour-ringed *fuscus* with *intermedius*- or even *graellsii*-type moult patterns are observed with some regularity (Jonsson 1998, Rauste 1999, Howell 2001, Gibbins 2004, Altenburg et al

2006, Koskinen & Rauste 2006) and may represent birds that spend the winter further north than usual (see, eg, the bird discussed and depicted in Klein 2001).

These observations suggest that, eg, the choice of the wintering areas may strongly influence the moult activity and thus the resulting moult pattern. Wintering further north or south than usual may result in the development of a moult pattern atypical for the taxon, possibly more similar to the typical moult pattern of another taxon.

The available knowledge does not allow to decide whether there is a genetic basis to the observed differences in moult patterns, or that they merely result from the same basic principles being subjected to different patterns of external factors (or any other concept). From the perspective of using moult as an identification feature, it thus seems wise to allow for a rather high degree of flexibility, in order to prevent giving it too much weight in the identification.

Apart from that, one should consider that there are many reasons why a bird can get behind in its moult schedule (illness, malnutrition), while it normally is rather difficult to get ahead of schedule. More particularly; the primary moult of *fuscus* during the first winter is ahead of the western taxa and thus provides a high degree of reliability for field identification, while the primary moult of adult *fuscus* can be considered behind on schedule compared with the western taxa and is thus not reliable as an identification feature.

Plumage variation

Plumage features have always had limited use for the field identification of Lesser Black-backed Gulls. This has much to do with the extensive variation within the species and within subspecies. In general, almost all plumage features mentioned by various authors as being suggestive of *fuscus* have now been found among birds belonging to the western taxa and continental western European birds may resemble *fuscus* in more respects than they recall typical *graellsii*. Here, some aspects of the plumage variation among Lesser Black-backed Gulls observed in the Netherlands are summarized in order to provide a broader perspective on western European Lesser Black-backed Gulls' appearance.

The timing of moult may have a strong effect on what feathers may end up looking like. An interesting example in this respect is that of Great Spotted Cuckoo *Clamator glandarius*: different populations of this species differ in the timing of the 'post-juvenile' moult in a way similar to Lesser Black-backed Gull. The plumage attained by this moult is similar to the juvenile plumage when acquired early but more adult-like in late-moulting birds (van der Elst & Hubaut 1990, Lansdown & Hathway 1995). This phenomenon has recently been discussed in relation to 'large white-headed gulls' (Howell 2001, Lonergan & Mullarney 2003) and many observations on Lesser Black-backed Gulls suggest this phenomenon applies to this species. This means that a single bird may grow differently patterned feathers –

210 Lesser Black-backed Gull / Kleine Mantelmeeuw *Larus fuscus*, third calendar-year, Wijster, Drenthe, Netherlands, 2 July 2001 (Rik Winters). *Graellsii*-type.

