

Identification update: moult variability in 3rd calendar-year Lesser Black-backed Gulls

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The Lesser Black-backed Gull *Larus fuscus* is a polytypic species, comprising at least three subspecies: *L. f. fuscus*, *L. f. intermedius* and *L. f. graellsii*. The closely related *L. [f.] heuglini*, whose taxonomic position is not yet entirely clear (for which, see Liebers *et al.* 2001, Crochet *et al.* 2002, Liebers & Helbig 2002 and Yésou 2002), is not discussed in this article. The nominate form occurs in the northernmost part of the breeding range of the species and breeds around the White Sea, the Baltic Sea and in northern Norway. The breeding grounds of *intermedius*, its close relative, are more southerly and westerly and comprise southern and western Norway, western Sweden, Denmark and Germany. The form *graellsii* is the westernmost taxon and breeds in Greenland, Iceland,

the Faeroe Islands, Ireland and Britain, as well as to the south, along the coasts of mainland Europe from the Netherlands south to Iberia. Hereafter, *L. f. fuscus* is referred to simply as *fuscus*, while the other two taxa are referred to as *intermedius* and *graellsii* respectively.

Lars Jonsson, in *Birding World* (1998), provided the first comprehensive paper on the subspecific identification of Lesser Black-backed Gulls. His article set many gull watchers – including the authors of this follow-up – in motion to study their local Lesser Black-backed Gulls in detail. In the field, we observed aspects of moult in Lesser Black-backed Gulls that seemed to contradict some of Jonsson's findings (*cf* Gibbins 2004), indicating that certain aspects of his article needed refinements.

Plate 1. Third calendar-year Western Lesser Black-backed Gull *Larus fuscus graellsii*, Neeltje Jans, Zeeland, the Netherlands, 11th July 2005 (*Pim Wolf*). This bird was ringed 'black W2XN' as a nestling at Barrow-in-Furness, Cumbria, England, on 9th July 2003. 'Classic' *graellsii* (*cf* Dwight 1925 and Grant 1986) has a limited moult in winter or spring involving mainly the head and body feathers. Sometimes several wing coverts and the upper tertials are replaced as well, as in 'W2XN' here. The tail, secondaries and primaries are retained. The complete moult commences in late spring, and this bird has P1-P2 new (not visible in the picture) and the outer primaries P6-P10 (visible at rest) still old. The tail feathers of this bird are brown and abraded, and brown secondaries are just visible beyond the tips of the greater coverts. The bill is already very adult-like.



This paper concentrates on the variation in the extent of the winter/spring moult exhibited by third calendar-year (3cy) Lesser Black-backed Gulls that have returned to Europe. It is important to note that it is based primarily on ringed birds of known age and known origin. We have assumed that all ringed birds are examples of the taxon breeding at the ringing locality.

Moult in 3cy Lesser Black-backed Gull

The traditional view used to be that Lesser Black-backed Gulls undergo two distinguishable moults in their third calendar-year: (1) a 'partial pre-breeding moult' in the winter quarters (from January to April) to attain a second-summer plumage and (2) a 'complete post-breeding moult' (from June to October) to acquire a third-winter plumage (Dwight 1925, Glutz von Blotzheim & Bauer 1982, Cramp & Simmons 1983 and Grant 1986). According to Dwight (1925) and Grant (1986), the 'partial pre-breeding moult' is restricted to the head and body feathers. Cramp & Simmons (1983) were the first to consider that moult strategies may differ between subspecies and mention that a few specimens of 3cy/4cy *fuscus* collected during winter and early spring showed obvious signs of primary moult. Jonsson (1998) and Rauste (1999) expanded on this and provided new insights to the plumage renewal in the winter quarters, raising awareness that the term 'partial pre-breeding moult' may not fully cover the extent of moult in *fuscus* (cf Gibbins 2004). When referring to the moult which takes place outside the breeding grounds, we therefore have chosen to apply the more general terms 'winter/spring moult' or 'moult on the wintering grounds' instead of 'partial pre-breeding moult'.

Lars Jonsson and Visa Rauste commonly encountered 3cy *fuscus* that had returned to their breeding areas with an obvious discontinuity between fresh inner primaries and old outer primaries. This interrupted moult most commonly occurred at a point in the outer five primaries, and is therefore fairly easily detected in resting birds (Jonsson 1998, Gibbins 2004). We are not aware of any publications addressing the renewal of the secondaries in 3cy *fuscus*. Recent authors have reached the preliminary agreement that tail feathers are normally at least partially renewed in *fuscus* (Jonsson 1998, Malling Olsen & Larsson 2004). Jonsson (1998) noted that both 3cy *graellsii* and *intermedius* - like *fuscus* - include rectrices in the moult on the wintering grounds. However, many authors still hold to the traditional view outlined by Dwight (1925) and Grant (1986) that 3cy *graellsii* and *inter-*

medius return to their native areas with retained remiges (Jonsson 1998, Gruber 1999, Malling Olsen & Larsson 2004). However, based on observations of 3cy birds in spring and summer, Muusse *et al.* (2001), Adriaens (2002), Gibbins (2004) and, to a lesser extent, Stewart (in prep.), concluded that at least some 3cy *graellsii* and *intermedius* undergo an extensive moult prior to their northward migration, including their primaries. This has obvious implications if the extent of the moult in winter or spring is to be employed as an identification tool.

Study method

For this paper, we studied returning or returned 3cy Lesser Black-backed Gulls along the North Sea and English Channel coasts (in the Netherlands, Belgium and France) between April and July in the period 2000 to 2005. Forty-six observations were eligible for this study as they involved birds ringed as nestlings within the known breeding ranges of *graellsii* and *intermedius*. We also visited Tampere, Finland, in July 2003, where we described 16 3cy individuals ringed as nestlings within the known breeding range of *fuscus*. We recorded the extent of the moult in the primaries, secondaries and rectrices in all birds observed. To record and assess the extent of this moult, we used binoculars, telescopes and digital cameras. The extent of primary moult was determined by simply establishing the number of newly attained primaries. The extent of the moult in the secondaries and rectrices was recorded by estimating the percentage of renewal within each feather tract. Renewed rectrices and remiges acquired in winter or early spring were identified on the basis of the quality, pattern and colour of a particular feather: retained feathers are typically worn and faded brown, whereas renewed feathers are fresh and often resemble the feathers of the adult in colour and pattern (see accompanying photographs). The term 'interrupted moult' is used to refer to the phenomenon by which moult has apparently stopped before the entire plumage has been renewed (Jenni & Winkler 1994).

Results

A total of 62 ringed 3cy Lesser Black-backed Gulls of known age and known origin have been included in this study, and our results are reported using the following four categories:

- (1) individuals with old rectrices and old remiges (18 birds)
- (2) individuals with renewed rectrices and old remiges (19 birds)
- (3) individuals with renewed rectrices, renewed secondaries and old primaries (6 birds)
- (4) individuals with renewed rectrices, renewed secondaries and renewed primaries (19 birds).



Plate 2. Third calendar-year Western Lesser Black-backed Gull *Larus fuscus graellsii*, Zeebrugge, West-Vlaanderen, Belgium, 29th May 2003 (Mars Muusse).

This bird was ringed 'BLB L-92923' as a nestling at Zeebrugge on 9th July 2001.

Commonly, all the primaries, secondaries and rectrices are retained through winter and spring, as on this bird. Note that few wing coverts and upper tertials have been renewed in the winter quarters. Some scapulars have also been retained but, in general, the brown wing covert panel contrasts with the grey saddle. This is a typical 3cy *graellsii* with a black tip to the bill.



Plate 3. Third calendar-year Western Lesser Black-backed Gull *Larus fuscus graellsii*, Amsterdam, the Netherlands, 2nd July 2005 (Ruud Altenburg).

This bird was ringed 'BLB L-106x34' (ring partly unreadable) as a nestling at Zeebrugge, West-Vlaanderen, Belgium, on 12th July 2003.

This is another 'classic' 3cy *graellsii* on which the grey saddle contrasts strongly with the worn brown wing coverts and tertials. The winter/spring moult has been limited to the head and body feathers only. The iris and legs are yellow, and the bill is typically patterned. Immature birds such as this normally commence their primary moult (beginning with the innermost) in late spring (see Plate 4).



Plate 4. Third calendar-year Western Lesser Black-backed Gull *Larus fuscus graellsii*, Amsterdam, the Netherlands, 16th July 2005 (Theo Muusse).

This bird was ringed 'NLA 5.412.042' as a nestling at IJmuiden, Noord-Holland, the Netherlands, on 8th July 2003.

Summer is progressing, and the second complete moult is well under way. In the primaries, note P1-P3 have been replaced by fresh grey, adult-like feathers. P4 is growing and P5 is missing. The outer five primaries (P6-P10) are old and it is most likely that all the flight feathers were retained through winter and spring. Note all the secondaries are still dark brown and not yet moulted. The similarly retained tail shows a broad brown tail-band.

Plate 5. Third calendar-year Western Lesser Black-backed Gull *Larus fuscus graellsii*, Amsterdam, the Netherlands, 18th June 2005 (Ruud Altenburg).

This bird was ringed 'red C73' as a nestling at Rotterdam, Zuid-Holland, the Netherlands, on 26th June 2003.

On this individual, note that many wing coverts and tertials have been replaced on the wintering grounds. Also, this bird has several renewed white tail feathers. This rather advanced appearance is common in *graellsii* (see Table 1).



Plate 6. Third calendar-year Western Lesser Black-backed Gull *Larus fuscus graellsii*, Amsterdam, the Netherlands, 18th June 2005 (Ruud Altenburg).

The same bird as in Plate 5.

In this different view of the bird above, more of the tail is visible; note that the outer tail feathers are still old and dark brown. Field observations established that the complete moult has begun, with P1 being new, P2 growing, P3 missing (not visible) and P4-P10 being old, all-brown feathers. Some Lesser Black-backed Gulls nesting in the Netherlands are darker on the upperparts than is normal for *graellsii* (eg see Plate 16), hence this population is sometimes referred to as the 'Dutch intergrades' (with *intermedius*).



Plate 7. Third calendar-year Western Lesser Black-backed Gull *Larus fuscus graellsii*, Zeebrugge, Belgium, 3rd May 2003 (Mars Muusse).

This bird was ringed 'BLB L-97134' as a nestling at Zeebrugge on 9th July 2001.

This is a particularly odd-looking individual, its plumage resembling a second calendar-year bird. Most of its scapulars are not plain grey, but instead show an anchor pattern or other internal markings. Also, the head is streaked and the flanks are mottled with brown. However, two tail feathers have been replaced with plain white feathers. The eye is pale, the bill is quite brightly coloured, but the legs are still pink. The appearance of this individual is very unusual for 3cy Lesser Black-backed Gull.





Plate 8. Third calendar-year Western Lesser Black-backed Gull *Larus fuscus graellsii*, Dordrecht, the Netherlands, 12th July 2005 (Theo Muusse).

This bird was ringed 'green K5' as a nestling at Moerdijk, Noord-Brabant, the Netherlands, on 20th June 2003.

By mid July, the complete moult can be well underway in 3cy *graellsii*, and this individual is already half-way through its primary moult. Note P1-P5 have been replaced by fresh, adult-like feathers, and these contrast with the brown retained secondaries. The latter are clearly visible because most of the greater coverts have been shed.



Plate 9. Third calendar-year Western Lesser Black-backed Gull *Larus fuscus graellsii*, Amsterdam, the Netherlands, 11th June 2005 (Ruud Altenburg).

This bird was ringed 'NLA 5.412.152' as a nestling at IJmuiden, Noord-Holland, the Netherlands, on 8th July 2003.

This individual has an advanced, almost 4cy-like appearance, although the bill still shows the characteristic black tip. Compare this bird especially to the more typical individual in Plate 3. Some outer wing coverts are retained brown feathers, and all the primaries were retained through winter and spring. However, the whole tail was renewed, as were nearly half of the secondaries.



Plate 10. Third calendar-year Western Lesser Black-backed Gull *Larus fuscus graellsii*, Amsterdam, the Netherlands, 18th June 2005 (Ruud Altenburg).

This bird was ringed 'red C00' as a nestling at Rotterdam, Zuid-Holland, the Netherlands, on 26th June 2003.

This is another bird with a completely renewed tail, which still looks rather fresh (compare to Plate 12). 'C00' has also replaced most of its wing coverts and all of its tertials in winter/spring. See also Plate 11.

Plate 11. Third calendar-year Western Lesser Black-backed Gull *Larus fuscus graellsii*, Amsterdam, the Netherlands, 18th June 2005 (Ruud Altenburg).

The same bird as in Plate 10.

The reliable ageing of secondaries is best attempted whilst birds are preening or stretching. In flight, 'C00' was seen to have renewed more than 25% (but less than 50%) of its secondaries. In this photograph, some of these renewed secondaries are visible, protruding just beyond the greater coverts. The complete moult has just begun with the inner primaries (P1-P3), with P4-P10 being old, retained, feathers.



Plate 12. Third calendar-year Continental Lesser Black-backed Gull *Larus fuscus intermedius*, Amsterdam, the Netherlands, 25th July 2003 (Ruud Altenburg).

This bird was ringed 'blue J4A3' as a nestling at Store Kraaga, Lindesnes, Vest Agder, Norway, on 5th July 2001.

The advanced moult of this *intermedius* in the winter quarters has produced an appearance unlike that of 'classic' *graellsii*. All the tail feathers are almost pure white and, having been renewed at the winter quarters, are already worn. Compare this to the tail of the *graellsii* in Plate 10. Almost all the wing coverts and secondaries (not visible here) have also been replaced. However, none of the primaries were renewed in winter/spring.



Plate 13. Third calendar-year Baltic Lesser Black-backed Gull *Larus fuscus fuscus*, Tampere, Finland, 14th July 2003 (Mars Muusse).

This bird was ringed 'white C1XE' as a nestling at Kanala, Vaasa, Finland, on 28th June 2001.

L. f. fuscus undergoes an extensive moult in the winter quarters, which includes some or all of the primaries. 'C1XE', a typical 3cy *fuscus*, has interrupted its moult at P8, with the inner primaries renewed and just the outer two primaries retained. The fresh primaries have small white tips and are glossy black, contrasting with the browner retained feathers. The mirror on P10 is exceptionally large. The worn scapulars and wing coverts show a mahogany hue characteristic of *fuscus*.





Plate 14. Third calendar-year Baltic Lesser Black-backed Gull *Larus fuscus fuscus*, Tampere, Finland, 12th July 2003 (*Mars Muusse*). This bird was ringed 'C1HA' as a nestling at Lammi, Häme, Finland, on 30th June 2001.

This *fuscus* has interrupted its primary moult at P8 prior to returning north; the renewed primaries contrast strongly with the retained outermost two feathers (which are bleached brown and heavily abraded). Some reduced black markings are visible in the tail, while only a tiny black mark is visible on the bill. The upperparts are adult-like, but dark grey and not blackish. There is some overlap in mantle colour between *fuscus* and *intermedius* (see Barth 1968 and Jonsson 1998).



Plate 15. Third calendar-year Baltic Lesser Black-backed Gull *Larus fuscus fuscus*, Tampere, Finland, 10th July 2003 (*Mars Muusse*). This bird was ringed 'white C2A5' as a nestling at Pälkän, Häme, Finland, on 25th June 2001.

This typical, very dark-mantled, *fuscus* shows a moult contrast between P7 and P8; note the tips of the outermost three primaries are brown and lack the white tips of the fresher feathers. The old P10 shows a white mirror. All the secondaries and rectrices have been renewed and appear immaculate. This combination of characters excludes *graellsii*. However, compare this bird with the *intermedius* in Plates 19-20.



Plate 16. Third calendar-year Western Lesser Black-backed Gull *Larus fuscus graellsii*, Maasvlakte, the Netherlands, 7th May 2003 (*Theo Muusse*). This bird was ringed 'NLA 5.366.282' as a nestling at Rotterdam, the Netherlands on 8th July 2001.

This individual replaced P4-P6 in the winter or spring (the tiny white tips to P5-6 are visible here). However, P1-P3 and P7-P10 were retained, so this is a rather atypical moult sequence. Most of the secondaries are retained feathers, thus this bird is an exception to the rule that birds with renewed primaries also show a large number of replaced secondaries. Most rectrices are renewed and almost completely white. Note the upperparts are on the darker side of the spectrum for *graellsii* (see caption to Plate 6).

Plate 17. Third calendar-year Continental Lesser Black-backed Gull *Larus fuscus intermedius*, Maasvlakte, the Netherlands, 3rd May 2004 (*Mars Muusse*). This bird was ringed 'SVS 810679x' (last digit not read) as a nestling at Yttre Tistlarna, Göteborg, Sweden, on 8th July 2002.

All but a few secondaries were renewed in winter or spring: the large white tips of the fresh secondaries are visible beyond the greater coverts. Apart from one outer tail feather, all the rectrices are white. Having renewed the innermost two primaries, the primary moult has been interrupted. Such an advanced moult approaches that of *fuscus*. This individual has erroneously been published as of Danish origin in *Vogeljaar* 52 (2004): 219.



Plate 18. Third calendar-year Continental Lesser Black-backed Gull *Larus fuscus intermedius*, Ijmuiden, the Netherlands, 2nd October 2003 (*Mars Muusse*). This bird was ringed 'SVS 8074722' as a nestling at Onsala, Halland, Sweden, on 19th June 2001.

The advanced moult in winter/spring, including the tail, secondaries and (probably) eight primaries, is similar to that of the bird in Plates 19-20. Note that the outer primaries (P9-P10) are very worn and bleached brown and contrast with the more recently acquired P6-P8. The complete moult has commenced in the inner primaries, hence P5 is missing, and P1-4 are new. The colour of the scapulars, wing coverts and tertials matches *intermedius/graellsii*, not *fuscus*.



Plate 19. Third calendar-year Continental Lesser Black-backed Gull *Larus fuscus intermedius*, Westkapelle, the Netherlands, 2nd September 2003 (*Mars Muusse*). This bird was ringed 'NOS 4217224' as a nestling at Hellesøy, Vest-Agder, Norway, on 19th July 2001.

The moult on the wintering grounds included the whole tail, all the secondaries and at least P6-P7 (probably P1-P7), where the sequence was interrupted. The wing coverts are a mixture of new dark and retained brown feathers. The complete moult began with the innermost primary and has now arrived at P5, which has been dropped. The advanced winter/spring moult and blackish upperparts of this 3cy *intermedius* are features more typically associated with 3cy *fuscus*.



Taxon	Origin	Cat. 1 (18 birds)	Cat. 2 (19 birds)	Cat. 3 (6 birds)	Cat. 4 (19 birds)	Total
<i>graellsii</i>	Britain	2	0	0	0	2
	Belgium	6	5	0	0	11
	Netherlands	10	14	4	1*	29
	total	18	19	4	1*	42
<i>intermedius</i>	Norway	0	0	2	1	3
	Sweden	0	0	0	1	1
	total	0	0	2	2	4
<i>fuscus</i>	Finland	0	0	0	16	16

Table 1. Variation in the extent of the winter/spring moult exhibited by returned 3cy Lesser Black-backed Gulls, sorted by geographical and sub-specific origin. This table has been compiled using the classification defined in the opening paragraph of the Results section. * Unlike all 20 of the other individuals included in this category, this Dutch bird showed almost entirely retained secondaries (see Plate 16).

It should be stressed that this categorisation is solely intended as a tool to present the variation found in the data, and is not intended to imply any fixed physiological or ecological differences between the birds. The data are summarised in Table 1, and examples from each category are illustrated in Plates 1-4 (Category 1), Plates 5-8 (Category 2), Plates 9-12 (Category 3) and Plates 13-20 (Category 4).

The 18 individuals in Category 1 had returned from their wintering grounds *without having renewed any rectrices or remiges*. The individuals comprising this least-advanced category, originated from Britain, Belgium and the Netherlands, whose breeding birds we consider as *graellsii*. Another 19 3cy Lesser Black-backed Gulls returned with a variable number of *renewed rectrices, but all the remiges still old*. In these Category 2 individuals, the number of replaced tail feathers ranged from one to all, with the latter being the most frequent (observed in seven of the 19 birds). All of these birds had been ringed as nestlings within the breeding range of *graellsii* (in Belgium and the Netherlands). We observed six birds with *renewed rectrices and renewed secondaries, but retained primaries*. These Category 3 individuals had replaced at least a large number of their rectrices and were characterised by a low (< 25%) to high (75% to <100%) percentage of replaced secondaries, while their primaries had not been replaced since their complete moult during the previous summer. The six individuals assigned to this category were hatched in the Netherlands (four birds) and southern Norway (two birds), thus within the breeding ranges of *graellsii* and *intermedius* respectively. The final category represents the most advanced

3cy Lesser Black-backed Gulls. The 19 birds included in this Category 4 were characterised by *renewed rectrices, renewed secondaries and renewed primaries*. All birds that had replaced their secondaries and primaries also showed an entirely or almost entirely renewed tail. The extent of the renewal of the secondaries varied from about three-quarters of the feathers to the entire feather tract, with the majority (10 out of 19) having attained a full set of renewed secondaries. The most variable aspect was the extent of the primary moult: individuals with a single renewed primary as well as birds with a full set of 10 renewed primaries were recorded. All but one of these birds appeared to have interrupted the primary moult before migrating to their natal areas, and 12 of them exhibited a contrast between the retained old and the newly acquired primaries within the outermost five primaries. Most birds assigned to this category originated from Finland (16), the core breeding area of *fuscus*. The remaining three individuals came from the Netherlands (1), western Sweden (1) and southern Norway (1), regions inhabited by *graellsii* (the Netherlands) and *intermedius* (western Sweden and southern Norway). Additionally, after July (and thus not included in the category tabulation), we observed three further 3cy Lesser Black-backed Gulls from southern Norway (2) and western Sweden (1) which had renewed primaries, secondaries and rectrices during the previous winter/spring (see Plates 18-20).

Discussion

Our results strongly support the notion that the continuous variation in the extent of moult on the wintering grounds in 3cy Lesser Black-backed Gulls is structured geographically, although not necessarily around currently accepted subspecies boundaries. The least advanced extreme consists of birds that have followed the traditional moult strategy defined by Dwight (1925) and Grant (1986). These 'classic' second-summers show both retained remiges and rectrices and comprise a substantial proportion of our observations from the breeding range of *graellsii* (18 out of 42). At the opposite end of the spectrum, we encounter Lesser Black-backed Gulls that have acquired new rectrices, secondaries and primaries prior to their northward spring migration. This most advanced extreme accommodates all of our 16 observations of 3cy Lesser Black-backed Gulls from the breeding range of *fuscus* and they perfectly fit the model developed by Jonsson (1998) and Rauste (1999). However, unlike Jonsson (1998), Gruber (1999) and Malling Olsen & Larsson (2004),



Plate 20. Third calendar-year Continental Lesser Black-backed Gull *Larus fuscus intermedius*, Westkapelle, the Netherlands, 2nd September 2003 (*Mars Muusse*). The same bird as in Plate 19.

This individual, hatched within the breeding range of *intermedius*, matches *fuscus* in the darkness of its upperparts; compare the colour to the Lesser Black-backed Gull behind it and the *fuscus* in Plate 14. It also demonstrates that interrupted primary moult can even be detected in autumn birds: note the extent of the moult on the wintering grounds in this individual matches that of *fuscus*. A moult contrast is evident between P7 and P8; in comparison to the dark, fresher-looking P6-P7, the outermost three primaries are bleached brown and are of a previous generation. The current active wing moult can be seen in Plate 19.

we found a few equally advanced birds hatched within the breeding ranges of *intermedius* (two out of 4) and *graellsii* (one out of 42). Between these extremes, there is a group of birds showing a large variety of intermediate moult stages. Almost half (19 out of 42) of the gulls hatched within the breeding range of *graellsii* fall into the less advanced half of this intermediate area; *ie* birds which have renewed only a variable number of tail feathers. The other, more advanced half of the middle bracket contains six individuals showing renewed rectrices and secondaries, but fully retained primaries. It is only in this section where we encounter the first two individuals from the breeding range of *intermedius*, in addition to four birds from Dutch breeding populations.

Considering this pattern, it is obvious that the replacement of remiges and rectrices on the wintering grounds in *graellsii* and especially *intermedius* is more variable and extensive than previously assumed. This notion not only contrasts with the traditional view represented

by Dwight (1925) and Grant (1986), but is also at odds with the picture drawn by the more recent publications of Jonsson (1998), Gruber (1999) and Malling Olsen & Larsson (2004). Our results fuel the contention raised by Muusse *et al.* (2001), Adriaens (2002) and Gibbins (2004) who, on the basis of field observations of (mostly unringed) 3cy Lesser Black-backed Gulls, argued that the extent of moult in the winter quarters in *graellsii* and *intermedius* is variable and overlaps with that of 3cy *fuscus*.

The results of our study of ringed birds substantiate the conclusion that all birds with renewed remiges acquired new rectrices too, but birds with old tails also retained their remiges. We also found that all 3cy Lesser Black-backed Gulls with renewed secondaries had also acquired new tail feathers, but had not necessarily replaced any primaries. This pattern is confirmed by substantial observations of unringed 3cy Lesser Black-backed Gulls in the Netherlands in spring (278 birds between 2000 and 2005).

We need to be careful about inferring the sequence in which the feathers may have been replaced in the winter quarters. We have, after all, not witnessed the moult process itself, but only the final results of this process in returning birds observed in northern Europe in spring and summer. Nonetheless, the most obvious scenario would be that moult on the wintering grounds in a 3cy Lesser Black-backed Gull progresses in the following, more or less overlapping and probably simplified, sequence: the rectrices first, followed by the secondaries, and finally the primaries. If so, this sequence is strikingly different to that described for the complete moult of the large gulls of the Northern Hemisphere by Dwight (1901, 1925), Ingolfsson (1970) and Malling Olsen & Larsson (2004). These authors concluded that the complete moult of these particular feather tracts commences with the replacement of the primaries, while the moult of the secondaries and rectrices begins when the primary moult has reached either P5 or P6.

Implications

Regarding the racial identification of Lesser Black-backed Gulls, what are the implications of our findings? Lars Jonsson's ground-breaking *Birding World* paper (1998) attempted to secure key characters that enabled him to separate *intermedius* and *graellsii* from *fuscus* at his local gull sites in eastern Sweden. A significant aspect of this paper was that he attributed a vital role to moult characteristics in the sub-specific identification of second-summer Lesser Black backed Gulls. On page 314, Jonsson stated: 'I would positively identify a second-summer Lesser Black-backed Gull in May showing predominantly dark wing coverts and very fresh inner six to eight primaries as *fuscus*'. However, he explicitly warned that his findings needed to be interpreted carefully in a western European context.

Our data demonstrate that 3cy Lesser Black-backed Gulls hatched within the normal breeding range of *intermedius* (and perhaps *graellsii* too) can match Jonsson's moult criteria for *fuscus*. Together with other recent findings regarding moult in second calendar-year Lesser Black-backed Gulls (Altenburg *et al.* in prep., Luijendijk *et al.* in prep.), our study shows that, as warned by Jonsson (1998), caution is indeed warranted if using moult features in the field identification of suspected out-of-range Lesser Black-backed Gull taxa (cf Howell 2001). It could be argued that the most useful identification tool for identifying a vagrant *fuscus* in Western Europe might well be the presence of an appropriate ring.

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