

Barn owl *Tyto alba*: nestling feathers and the downs of the adults

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Introduction

During ringing we realized that the downs of the nestlings in the barn owl by no means were coloured as uniformly as we had supposed. Our search in the literature then brought to light a second point for which we needed elucidation: the morphology and the growth of the nestling downs. This indeed grew much more troublesome than we had expected. As we supposed, others would have similar difficulties, we precede our results to the down coloration by a short review of the literature. Onto that we add a short mention to the downs of the adult birds.

Morphology and growth of the nestling downs following the literature

Freshly hatched barn owls bare – dispersed over the body, clearly visible on the upper side, less clear on the under parts – first downs, which by BUSSMANN (1937) were called „first downs“, by BERNDT & MEISE (1958: 25) “nest downs” and by MEBS & SCHERZINGER (2003: 16) “egg downs”. (We prefer this latter nomination as barn owls still in the “nest” bare a second down plumage.) The Latin name for the single egg down is “neoptile”. This first plumage correspondingly is called “egg down plumage” or also “neoptile” and after MEBS & SCHERZINGER (2003) and HARRISON & CASTELL (2004) is short and sparse. As soon as this neoptile is unfolded after hatching, it appears whitish (MEBS & SCHERZINGER 2003:16, HARRISON & CASTELL 2004). As in the “body downs” which like in many birds also in the adult stage are found beyond the covering plumage (being formed by contour feathers) the egg downs are a bundle of fluffy branches, which all have their origin in the tip of a “shaft like structure” being at least one mm long (BERNDT & MEISE 1958:25 and fig. 15c,d). this shaft like structure after BUSSMANN (1937) indeed is not stable (“Thus a special shaft nowhere is formed by the down plumage”).

Different from other avian families the neoptile in the owls is followed by one more nestling plumage, the transient plumage or mesoptile. Such a transient feather, a mesoptile, (BERNDT & MEISE 1958:25, BUSCHING 1997) in nearly all owls is a semi down (with a soft shaft and laterally inserting down branches). A mesoptile, yet of a snowy owl (hence with shaft) is depicted in BERNDT & MEISE (1958) as fig. 15h. Only in the barn owls this transient feather has the same structure as the egg down (neoptile) hence is a real down (MEBS & SCHERZINGER 2003:128). Different from this nomenclature the hand book (GLUTZ & BAUER 1993) calls the mesoptile “the down feathers of the immature plumage”. After all authors (BUSSMANN 1937, GLUTZ & BAUER 1993, MEBS & SCHERZINGER 2003) the mesoptiles grow beginning with day 10.

During the development of the mesoptiles from the respective feather germs, obviously the basal end of the neoptiles, in which the branches had been united, dissolves. The consequence is that “the barbs of the neoptile only individually sit on the branches of the mesoptile” (BUSSMANN 1937:381). This description also clarifies the figure 15h in BERNDT & MEISE (1958), showing the mesoptile of a snowy owl, in which single branches of the neoptile are fixed on the top of the barbs of the neoptile. In the belonging legend we read “with on sitting egg downs (Primeln)”.

We should keep in mind that each contour feather is preceded by a down of the transient plumage (BUSSMANN 1937, PORTMANN 1985). This latter one for some time appeared in German 2008: Schleiereule *Tyto alba*: Die Federkleider der Nestlinge und die Dunen der Altvögel. Eulen-Rundblick 58:

is attached to the tip of the growing feather of the contour plumage and clearly visible there.

The mesoptile is followed by the neoptile, the immature plumage, which in the barn owl does not differ from the following feather generations.

How two generations of feathers generally follow each other, in detail is described by PORTMANN (1985), where his descriptions and figures partly base on BECKER (1959).

On the coloration of the neoptiles

All authors cited here do call the neoptile whitish.

On the coloration of the mesoptiles

The descriptions of the authors differ: "in the lighter forms whitish, in the darker ones grey on the upper side and beneath with an ochre yellow flush" (SCHNEIDER 1977:11 after O and A KLEINSCHMIDT 1906 and 1998); "whitish, underneath with a yellowish, on top with a greyish flush" (Niethammer 1938); "upper side whitish grey and beneath whitish yellow" (MEBS & SCHERZINGER 2003), and "grey on top and below yellowish" (HARRISON & CASTELL 2004). In connection with the mesoptile of the Ural owl MEBS & SCHERZINGER (2003) wrote that it is very variable. This obviously includes the other owls and so also the barn owl.

Results

The nestlings studied all originate from broods in southern Lower Saxony. The back of the birds was judged. As the far most frequent coloration variety (roughly estimated >80%) we found a light beige (five of the seven pulli in fig. 1). Then there was a small part in which the beige in smaller or larger spots was replaced by grey or anthracite (figs. 2-4). This coloration more rarely affected the backward parts, sometimes the total body. Very rarely we found totally white downs (see fig. 1). These two chicks with a totally white mesoptile later proved to be entirely white bellied (fig. 5). The chicks in the figures 1-5 in each case are siblings. In figure 5 not only those two with a white mesoptile from figure 1 are purely white beneath but also at least two more birds (one of them right in the background with white face). The latte ones had, as visible in figure 1, a beige mesoptile. Hence white mesoptile and white underparts in the adult birds not always are connected.



Figure 1: Seven barn owl siblings, five of them beige, two white
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Figure 2: Barn owl siblings, in which the beige peltily (central bird) or distinctly (left) is replaced by grey



Figure 3: Siblings of the barn owl, in which the beige in a variable extent is replaced by grey or dark grey. At left a purely beige coloured bird.



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Figure 4: Siblings of the barn owl, in which the beige in a variable extent is replaced by anthracite.



Figure 5: Same chicks as in fig. 1: The two in the foreground with white face are those with the white mesoptile. In the foremost, youngest one the partly still preserved downs of the mesoptile cannot be distinguished from the feathers of the neoptile by coloration.

The parent birds

The mother of the siblings in the figures 1 and 5 had mostly white under parts with very few spots (fig. 6), the father one with light beige tones and many greater spots (fig. 7).



Figure 6: Parent bird (♀) of the siblings in the figs. 1 and 5



Figure 7: Parent bird (♂) of the siblings in the figs. 1 and 5

Short remark to the downs of the adult barn owls

The control of the situation in an adult bird, which was coloured mostly like that in figure 7, gave the following result: As well in the under parts as in the upper ones of the rump there were real downs. The dark grey branches (rami) of which were about 25-30mm in length. Besides we rarely found semi downs with a total length of about 30mm and a shaft length of 20mm. In the distal part of these semi downs the branches were slightly lighter. From these semi downs to the real contour feathers with a very extent basal downy part there were all transient forms, i.e., the more distal, not downy part increased steadily, until it clearly surmounted the basal part in length.

Discussion

One problem concerning colour determination of mesoptiles is that photographs sometimes are taken with flash, and sometimes without. Flash light heavily is reflected by the dunes regardless of their coloration so that they seem to be lighter, whiter than they really are. On the other hand they formerly very compact mesoptiles unfold by time and then seem to be darker. Pollution too may alter the colour impression as well.

The descriptions above are not based on systematic study but on notices and photographs of some broods. So they are neither quantitative nor representative. They show the variability and give a first impression of the frequencies of the variants.

Colour photographs in EPPLE & ROGL (1988:26f) and BAUDVIN & PERROT (2005:88) show that the colours whitish-yellow to beige also in the southern and western Central Europe are the basic colouration of the mesoptile. They show also that the separation between white and beige found here is merely hazardous. In both authors there may be found all transitions. The parent birds belonging to these chicks in these books underneath are very light to white.

After the communication of SCHNEIDER (1977) cited above that in the darker forms the mesoptile on the back was preferably grey it is astonishing that we here found only

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very few specimen with a grey back. At least the darker specimen (*guttata*) in the population studied reach an amount of about 70% (KNIPRATH 2006).

Summary

Beforehand after the literature the morphology and the development of the down plumage in the barn owl are described. Then follows the description of the colour variants of the mesoptile hitherto found: besides the "normal" whitish/beige until beige also grey/anthracite in a variable distribution and colour density, and brightly white. The under part colouration of the adult plumage (and likewise the immature one) not with certainty is predictable by the colouration of the mesoptile. In the adult bird on the upper as well as on the under parts of the rump we found downs and rarely also semi downs.

Key words: *Tyto alba*, downs, down colouration

Literatur

BAUDVIN H & PERROT PH (2005): *alba*. Dijon

BECKER R 1959: Die Strukturanalyse der Federfolgen von *Megapodius freyc.* reinw. und ihre Beziehung zur Nestlingsdune der Hühnervögel. Rev. Suisse Zool. 66:411-527

BERNDT R & MEISE W 1958: Naturgeschichte der Vögel. Franckh, Stuttgart

BUSCHING W-D 1997: Handbuch der Gefiederkunde europäischer Vögel Bd. 1, Wiesbaden

BUSSMANN J 1937: Biologische Beobachtungen über die Entwicklung der Schleiereule. Schweiz. Arch. Orn. 1:377-390

EPPLE W & ROGL M 1988: Die Schleiereule: Der lautlose Jäger in der Nacht. Luzern

HARRISON C & CASTELL P 2004: Jungvögel, Eier und Nester der Vögel Europas. Wiebelsheim

KNIPRATH E 2006: Zur Unterseitenfärbung einer Population der Schleiereule *Tyto alba* „*guttata*“ in Südniedersachsen. Vogelwarte 44: 233-234 (translation available at: www.kniprath-barn-owl.de)

MEBS T & SCHERZINGER W 2003: Die Eulen Europas. Kosmos

NIETHAMMER G 1938: Handbuch der deutschen Vogelkunde

PORTMANN A 1985: Die Vogelfeder als morphologisches Problem:18-43 in: BUB H: Kennzeichen und Mauser europäischer Singvögel. Allgemeiner Teil. Die Neue Brehm Bücherei Bd. 570 (we used the reprint of 1995, Westarp)

SCHNEIDER W 1977: Schleiereulen. Die neue Brehm Bücherei Bd. 340 (we used the reprint of 1995, Westarp)

Appeared in German 2008: Schleiereule *Tyto alba*: Die Federkleider der Nestlinge und die Dunen der Altvögel. Eulen-Rundblick 58: 54-57