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A rare dark morph in the Canadian Arctic raises questions about molting and polymorphism in Long-tailed Jaeger (*Stercorarius longicaudus*)

Don-Jean Léandri-Breton,^{1†} Mikaël Jaffré,^{1*†} and Joël Bêty¹

ABSTRACT—The existence of a dark morph in adult Long-tailed Jaeger (*Stercorarius longicaudus*) is still unclear and debated. For this species, dark plumages occur in juveniles and immatures, but no dark morph adults have yet been unequivocally confirmed. Ambiguous reports of presumed dark morph adults and lack of information on molt progression of immatures generate confusion regarding this issue. Here we describe observations conducted in the Canadian Arctic (Bylot Island) and show that Long-tailed Jaegers can apparently exhibit dark morph adult-like plumage (i.e., individuals showing some obvious criteria associated with definitive alternate ‘adult breeding’ plumage). Careful examination of those sightings, however, also revealed immature characteristics, indicating the high variability of the first prealternate molt in this species. Well-documented observations of rare plumages like the one reported in this study are needed to elucidate molting strategies and polymorphism in Long-tailed Jaeger. Received 4 October 2016. Accepted 3 June 2017.

Key words: avian trapping technique, Band-tailed Pigeon, columbid, New Mexico, whoosh net.

Tasas de captura y heridas de la paloma *Patagioenas fasciata* usando redes de proyectil

RÉSUMÉ (French)—L’existence d’un morphe sombre chez l’adulte de Labbe à longue queue (*Stercorarius longicaudus*) demeure incertaine et fait encore débat aujourd’hui. Pour cette espèce, les plumages sombres sont présents chez certains juvéniles et immatures, mais aucun adulte de morphe sombre n’a à ce jour été confirmé de façon certaine. Des rapports ambigus de présomés adultes de morphe sombre et le manque d’information sur la progression de mue des immatures ont généré de la confusion sur cette question. Nous décrivons ici des observations réalisées dans l’arctique canadien (Île Bylot) démontrant que le Labbe à longue queue peut effectivement présenter un plumage sombre chez des individus d’apparence adulte (c’est-à-dire des individus montrant certains critères clairement associés à un plumage alternatif définitif “d’adulte nicheur”). Cependant, un examen minutieux des critères de plumage observés a aussi révélé la présence de traits immatures, révélateur de la haute variabilité de la mue pré-alternative chez cette espèce. De telles observations bien documentées de plumages particuliers procurent de rares exemples nécessaires à une meilleure compréhension des stratégies de mues et du polymorphisme chez le Labbe à longue queue.

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Mots-clefs: morphe sombre, Labbe à longue queue, polymorphisme, progression de mue, *Stercorarius longicaudus*.

Polymorphism is defined as the coexistence within an interbreeding population of 2 or more distinct and genetically determined ‘morphs’ for which the frequency of the rarest morph is too high to be solely explained by recurrent mutation (Ford 1945, Huxley 1955). Only 3.5% of all bird species exhibit plumage polymorphism (Galeotti et al. 2003), and some of the best-known examples of polymorphism are found among jaegers. Parasitic (*Stercorarius parasiticus*) and Pomarine (*S. pomarinus*) jaegers both show striking dark and light morphs (Olsen and Larsson 1997). Polymorphism in juvenile Parasitic Jaegers is particularly variable, with a gradation of intermediate plumages between light and dark morphs (Olsen 1989). This continuous gradation in plumage is also found in juvenile and other immature plumages of the closely related Long-tailed Jaeger (*Stercorarius longicaudus*; Cramp and Simmons 1983, Olsen and Larsson 1997). Within this species, 30% of juveniles are mostly dark, but extreme dark morph juveniles account for no more than 1–2% of the population (Olsen and Larsson 1997). The darkest birds are recognized as distinct dark morph juveniles, as observed in other jaegers (Roselaar and Prins 1999). But unlike other jaegers, no reliable reports exist of dark morph adults in Long-tailed Jaeger (Wiley and Lee 1998). Numerous sightings have been reported of presumed dark adults in definitive plumage (e.g., Veit 1985), but these sightings lack details to rule out age or species misidentification (Wiley and Lee 1998, Roselaar and Prins 1999). The need for well-documented reports and more information about molt progression is essential to elucidate the existence of a dark morph in adult Long-tailed Jaeger. With this aim in mind, we describe a dark morph Long-tailed Jaeger that would easily be

considered an adult in definitive alternate plumage, but we also observed some conflicting criteria probably indicating plumage immaturity. We discuss hypotheses behind this peculiar plumage in view of molt progression and polymorphism.

Observations

On 15 July 2015 at 1500 h Eastern Standard Time, a dark morph Long-tailed Jaeger was located opportunistically along a glacial river during shorebird and lemming surveys (72°53'19"N, 79°53'32"W; MJ, pers. obs.) on Bylot Island (Nunavut, Canada). The dark individual, accompanied by a light morph adult Long-tailed Jaeger, was displaying agonistic behavior against a Parasitic Jaeger much like a territorial defense. The birds disappeared before photos could be taken. No nest was found in the area but only a superficial search was conducted.

A dark morph Long-tailed Jaeger was spotted again on 17 July 2015 at 1945 h close to the river mouth about 3 km from the first sighting (72°50'56"N, 79°54'04"W; MJ, pers. obs.). The dark individual was part of a group of 7 Long-tailed Jaeger adults that displayed no aggressive interactions. Groups of jaegers, likely failed breeders or nonbreeders, often gather in this area in July (DLB, JB, pers. obs.). The bird was observed for >2 min, as close as 20 m from the observer. Some photos were taken with a Canon EOS 70D (Canon lens EF 100-400; f4.5–5.6 M; ISUSM; ISO250; speed 1/1250 s; no flash) and were slightly lightened in post-processing.

A dark morph jaeger was seen again on 19 July 2015 at 1730 h in the same area along with 3 other light morph adults (DLB, pers. obs.). We assume the 3 sightings of a dark morph jaeger belong to the same individual because (1) the plumage was similar, (2) the sightings were within a few kilometers along the same river, and (3) no dark morph Long-tailed Jaegers were previously reported on Bylot Island despite intensive long-term ecological monitoring, including a close monitoring of the breeding population in recent years (Therrien et al. 2014). Lemming abundance was relatively high in 2015 based on live trapping data, and Long-tailed Jaegers were nesting at a moderately high density (G. Gauthier, Laval University, CA, 2016 pers. comm.).

Results and discussion

During the field observations of a dark morph individual we noticed criteria associated with a definitive alternate (adult breeding) plumage, which is acquired with the first definitive prealternate molt in March–April (Olsen 1989). According to most authors, this molt occurs in 3-year-old individuals during their fourth calendar year (Cramp and Simmons 1983, de Korte 1985, Olsen 1989). The first obvious criterion was the fully elongated tail streamers associated with the definitive alternate plumage of breeding adults (de Korte 1985, Olsen 1989). Tail streamers that long (Fig. 1b) are a distinctive adult feature; the immatures have clearly shorter central rectrices (Collection of the Zoological Museum of the University of Amsterdam, 215 specimens; C.S. Roselaar, Naturalis Biodiversity Center, Netherlands, 2016, pers. comm.).

The second criterion was the mostly plain underparts with unspotted underwing coverts and uniform dark axillaries and undertail coverts (Fig. 1a). Such birds are classified as fourth calendar year individuals or older (de Korte 1985). By contrast, juveniles and immatures have white feather tips, resulting in barred and spotted underwing and undertail coverts (Olsen 1989, Roselaar and Prins 1999). These observations, combined with interspecific agonistic behavior displayed by the paired individual during the first sighting, strongly suggest that the dark morph bird was an adult. Such behavior is typically associated with territoriality in breeding adults (Andersson 1981).

Other details noted in the field and further investigation of photographs revealed conflicting criteria, however, suggesting that the dark morph bird also had some immature plumage characteristics. In this species, the streaked throat suggests immaturity, and the paler hindneck contrasting with the darker cap is usually associated with the darkest juveniles (Olsen and Larsson 1997). The brownish mantle (seen in the field and partly visible in Fig. 1c) was also a possible sign of immaturity because adults typically show a colder gray tinge to upperparts with a stronger contrast with blackish remiges (Olsen 1989). Most importantly, even if the underwing coverts were unspotted, they had a line of whitish-fringed feathers along the median coverts (Fig. 1a) that



Figure 1. Photographs (a, b, and c) of a dark morph Long-tailed Jaeger. Note the elongated tail streamers and the mostly unspotted and unbarred axillaries, underwing, and undertail coverts. Other details are the general dark brown coloration, the paler hindneck and streaked throat, the brownish mantle, the line of whitish fringed feathers in the median underwing coverts, and the lighter patches of the abdomen. Photo by Mikael Jaffré.

contrasted with the plain underwings of adults (de Korte 1985, Olsen and Larsson 1997). In review of all criteria, the dark morph individual we observed was likely in its fourth calendar year because it had its first definitive alternate (breeding) plumage for at least its 2 central rectrices and axillaries, but it also showed some signs of plumage immaturity.

The most intuitive hypothesis about the definitive appearance of this individual is that the immature criteria were the last remnant of an immature plumage and the dark coloration was hence part of the definitive alternate plumage. De Korte (1985) reported such molt incompleteness in fourth calendar year light morph individuals that still showed traces of the spotting found on underwings of younger individuals. If this hypothesis is correct, the individual we observed would then keep its dark morph plumage after completion of its molt, resulting in a genuine adult dark morph Long-tailed Jaeger.

Alternatively, the dark coloration possibly resulted from an interruption of the prealternate molt with much retained dark immature plumage. In agreement with this second hypothesis, we also noted that the abdomen was not entirely plain dark but showed lighter patches contrasting with the dark abdomen (Fig. 1a). The irregular pattern provided some support that 2 generations of feathers were overlying one another rather than being an intermediate morph, suggesting that the individual was possibly in transition to a paler plumage and, therefore, that the dark brown coloration was not part of the definitive alternate plumage (R.H. Wiley, University of North Carolina, USA, 2016, pers. comm.). According to some authors, the dark morph in Long-tailed Jaegers is believed to only occur in juvenile and immature plumages (Olsen and Larsson 1997, Wiley and Lee 1998).

A third possibility would be that the dark coloration is caused by melanism, although we

think this hypothesis is less likely because of the plumage coloration similarity with dark morph immatures already reported (Roselaar and Prins 1999). Also, chromatic aberrations are rare in Larids and their allies in general (Sage 1997) and, to the best of our knowledge, have never been reported in skuas and jaegers.

Because of the combination of adult and immature criteria exhibited by the observed individual, we can only hypothesize about its final plumage appearance. Whether such combinations result from a molt incompleteness (hypothesis 1) or from an interruption of the first prealternate molt (hypothesis 2), they reflect the high variability in timing or extent of immature molt preceding the first definitive alternate plumage (de Korte 1985). The phenomenon of interrupted molt has been reported in many avian groups, including seabirds (Jenni and Winkler 2004). Interrupted molt may occur in slower-developing individuals (Wiley and Lee 1998) and should be considered when assessing plumage progression, especially in Long-tailed Jaegers, which largely depend on cyclic lemming populations for reproduction (Therrien et al. 2014). Molt and reproduction are 2 energetically demanding activities (Payne 1972), and hence postponing the completion of the molt could allow these birds to allocate more energy for reproduction, especially during years when food availability on the breeding ground is high, such as 2015 on Bylot Island.

The controversy about the existence of a dark morph in adult Long-tailed Jaeger is obscured by the lack of information about molt progression in jaegers because molting mainly occurs at sea during the nonbreeding season (de Korte 1985). Detailed reports of peculiar cases such as the one we describe here can provide new information on molting strategies in Long-tailed Jaeger and polymorphism in general.

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