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Unusual incubation: Long-billed Dowitcher incubates mammalian bones

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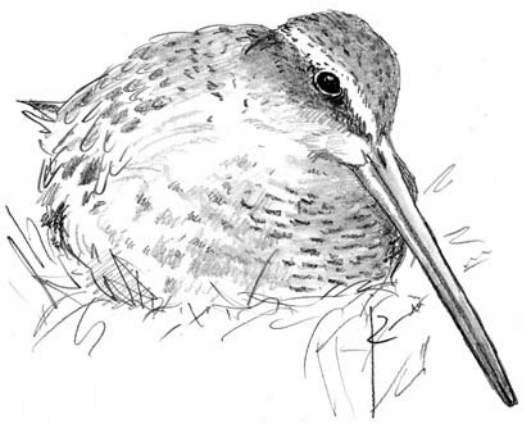

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It is well established that once birds have laid their eggs they sometimes incubate non-egg objects. However, reports of birds incubating solely non-egg objects (without prior manipulation by researchers) are rare. Here we report on our observation of a Long-billed Dowitcher *Limnodromus scolopaceus* incubating a clutch composed entirely of mammalian bones. To our knowledge, this is the first report on (a) incubation of foreign objects in *Scolopacidae*, (b) incubation of a 'clutch' composed entirely of bones, and (c) incubation of foreign objects in a nest atypical for this species in both construction and nest habitat. We discuss possible explanations for this presumably maladaptive behaviour.

Key words: incubation, non-egg object, Long-billed Dowitcher, *Limnodromus scolopaceus*, pseudo-egg, nesting habitat

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Non-egg objects are commonly found in the nests of some ground-nesting species, notably larids and anatids (Sugden 1947, Twomey 1948, Blus & Henny 1980, Coulter 1980, Conover 1985). Non-egg objects vary in size and resemblance to the birds' real eggs and commonly include stones; however, on rare occasions they can also include pinecones, guano, glass and plastic bottles (summarized in Table 1).

Incubation of non-egg objects has been previously attributed to egg retrieval, where birds along with returning their errant eggs into the nest cup may also bring unrelated eggs or foreign objects into their nest (Lorenz & Tinbergen 1938). While it has been experimentally shown that birds will continue incubating non-egg objects when all their own eggs are removed from the nest (Conover 1985), reports of wild birds incubating 'artificial clutches' composed solely of non-egg objects (without prior manipulation by researchers) are exceedingly rare (Knight & Erickson 1977). Here we report on a detailed observation of a Long-billed Dowitcher *Limnodromus scolopaceus* incubating unidentified mammalian bones in an atypical dowitcher nest.

Study area and species

The Long-billed Dowitcher (hereafter referred to as dowitcher) is a medium-sized shorebird that breeds in the arctic tundra, ranging from northeastern Russia to northwestern Canada (Kessel 1989). Breeding habitat consists of wet, grassy meadows (Pitelka 1950), or tall tufts of vegetation near pond edges (Kessel 1989). The nest is a simple depression on grass or moss, lined with sedges, grasses, and small leaves. Nests are often damp at the bottom and have a cup inner diameter of 10.2–12.7 cm, depth of 5.1–6.4 cm (Brandt 1943, Kessel 1989). The nest is placed in very wet microhabitat, usually on the border between the dry bank and the flooded inner area of a tundra polygon (Glutz von Blotzheim 1999).

Dowitchers lay one clutch of 3–4 eggs per season and eggs measure on average 42.5 mm in length and 30.0 mm in width (Takekawa & Warnock 2000). On the North Slope of Alaska first eggs were found between 8–12 June (Johnson & Herter 1989). Near our study site in Barrow, Alaska (71°31'N, 156°66'W, described in detail by Ashkenazie and Safriel (1979)), first eggs were laid between 11–24 June (2011 season, R. Lanctot unpubl. data). Both sexes incubate (Brandt 1943, Kessel 1989). The incubating dowitcher sits tightly on the nest and blends in with the surrounding vegetation (pers. obs.).

Methods and results

On 21 June 2011 at 16:00 h we discovered a dowitcher incubating a clutch composed of twelve intervertebral discs and one elongated bone of an unidentified mammal (Figure 1). The bones did not resemble dowitcher eggs: they were obviously smaller (on average approximately 27 mm length, 17 mm width, measured from a photograph) and of different shape (Figure 1). The discs were arranged on their flat side creating a level surface for the bird to sit. Additional bones similar in nature were found in the surrounding area (within 2 m of the nest). The nest was exposed and shallow (no nest cup) and approximately 20 cm in diameter. The nest microhabitat was dry and amongst short vegetation.

Upon our approach, the dowitcher flushed from the nest and displayed rodent run distraction behaviour

Figure 1. (A) The Long-billed Dowitcher 'clutch' of twelve intervertebral discs and one elongated bone of an unidentified mammal; photo taken on 26 June 2011. (B) Normal clutch from a Long-billed Dowitcher nest at the study site.

Table 1. Reports of non-egg objects naturally occurring in nests of wild birds.

Species	Object type	Presence of real eggs	Source
Pelecaniformes			
Blue-footed Booby *Sula nebouxii*	Stone	No	Mellink 2002
Brown Booby *Sula leucogaster*	Stone	No	Mellink 2002
	Guano	Yes	Mellink 2002
Double-crested Cormorant *Phalacrocorax auritus*	Stone	Yes and No	Hobson 1989
Anseriformes			
Black Swan *Cygnus atratus*	Glass bottle	No	Guay *et al.* 2006
Canada Goose *Branta canadensis*	Stone	No	Hanson & Eberhardt 1971
	Stone, pinecone	Yes and No	Knight & Erickson 1977
Common Eider *Somateria mollissima*	Plastic bottle	No	R. Lanctot, unpubl. data
Charadriiformes			
Northern Lapwing *Vanellus vanellus*	Stone	Yes	M. Bulla & M. Šálek, unpubl. data
American Avocet *Recurvirostra americana*	Stone	Yes	Sugden 1947
Long-billed Dowitcher *Limnodromus scolopaceus*	Bone	No	Present study
California Gull *Larus californicus*	Stone	Yes	Conover 1985
Ring-billed Gull *Larus delawarensis*	Stone	Yes	Conover 1985
Western Gull *Larus occidentalis*	Stone	Yes	Coulter 1980
Common Tern *Sterna hirunda*	Stone	Yes	Coulter 1980

Figure 2. Still shot from video footage of the Long-billed Dowitcher flushing from the nest; video taken on 22 June 2011.

typical of shorebirds incubating a nest (Simmons 1952). The following day between 15:00 and 15:30 h we videotaped the bird with a digital camera from a minimum distance of 3 m as it incubated the nest and flushed when we approached (Figure 2). The bird flew only a few meters away from the nest and returned to it immediately once we moved away; seven minutes later we recorded a second video of the incubating bird. Upon the second disturbance, the incubating bird and its assumed partner located approximately 10 m away flew to a distant area of the field site.

To determine whether the bird was actually incubating, we (a) installed a temperature probe (Tinytag Talk PB-5005-0M6) in the centre of the nest and connected it to a Tinytag Talk TK-4023 data logger (Gemini Data Loggers, Chichester, West Sussex, UK)

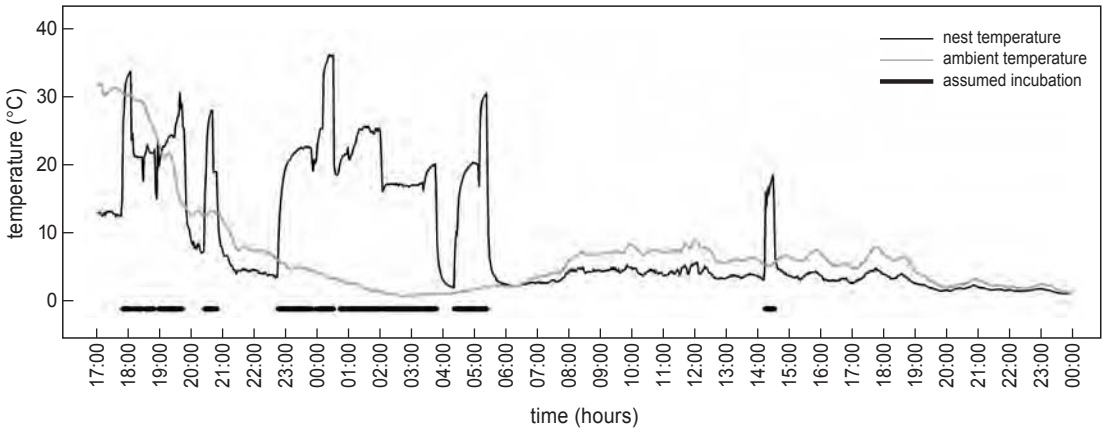

Figure 3. Assumed incubation/non-incubation pattern of the Long-billed Dowitcher based on recorded nest and ambient temperature (22–23 June 2011). A steep rise in nest temperature and nest temperatures above the ambient temperature indicate incubation.

and (b) monitored the ambient temperature approximately 10 m from the nest by a HOBO Pendant® Temperature/Light Data Logger (Part# UA-002-64, Onset Computer Corporation, Bourne, MA). The Tinytag and HOBO Logger recorded from 22 June 2011 at 16:00 h to 27 June 2011 at 10:30 h. The temperature recordings revealed that the dowitcher incubated almost continuously throughout the first night (approximately from 18:00 to 05:00 h). Median incubation bouts were 16 min (range: 2–100 min) and 9 min for off-bouts (range: 2–116 min; Figure 3). The bird concluded incubation in the morning and returned to the nest almost 9 h later, at 14:30 h for a 16 min incubation bout. After this final bout we continued recording for an additional 92 h, but the bird never returned, and we therefore assumed it deserted the nest (23 h after probe installation). Based on the initial discovery date, we estimate the bird incubated the nest for at least two days.

Although there was a pair of birds present, the recorded temperature pattern does not allow us to discriminate between whether one or two birds incubated the nest. The nearly continuous incubation pattern during the first night is typical of both uniparental and biparental breeders. However, it seems most likely that only one of the two pair members incubated this unusual 'clutch' and this may be the reason why the bird deserted the nest after a few days.

Discussion

We observed a Long-billed Dowitcher incubating a 'clutch' containing exclusively mammalian bones: this behaviour is very unusual because (a) there were no eggs, (b) the number of non-egg objects far exceeded the normal clutch size, (c) the objects did not resemble dowitcher eggs and (d) the nest was atypical for this species, both in shape and in location (microhabitat). The reasons for this perplexing behaviour are unknown: we suspect the bird gathered the bones within the surrounding area, which contained remnants of a mammalian skeleton. Although we cannot exclude that eggs had been present before we discovered the nest (and were depredated), this seems unlikely because the nest did not at all resemble a typical dowitcher nest. We speculate that the dowitcher pair previously had a normal nest nearby (suitable habitat was present within the range of a typical territory), which was depredated. There is no evidence that a person arranged the bones, as people rarely venture out on the study area during the breeding season (based on the observations of a team of 8–10 researchers (our group) working on the site in June–July). However, this possibility cannot be entirely excluded. Even if a person would have arranged the bones, the behaviour of the bird remains very unusual.

Several hypotheses have been proposed to account for the presence of non-egg objects in wild bird nests. Egg retrieval, where incubating birds roll errant eggs into the nest cup, which occasionally leads to the incorporation of non-egg objects (Mellink 2002) is unlikely in this case, because no real eggs were present. The mistaken-food hypothesis, where non-egg objects are brought back to the nest as food and subsequently incubated when the reproductive desire is strong, is often speculated for larids and stercorariids (Sugden 1947, Twomey 1948, Crawford 1974), yet is improbable for dowitchers as eggs are not a part of their diet (Cogswell 1977). Conover (1985) proposed the mistaken-egg hypothesis where birds treat non-egg objects as if they are their own eggs. Under this hypothesis, the incubation bird is expected to (a) move the non-egg object back into the nest cup after it is experimentally placed outside the nest, and (b) to continue to incubate the non-egg object(s) even after all real eggs have been experimentally removed. We could not perform these tests, because there were no eggs and because the dowitcher did not incubate long enough to conduct manipulation trials. Possibly, the "young and inexperienced bird" hypothesis might be applicable to our finding (Crawford 1974, Hobson 1989). For example, Hobson (1989) found that most Double-crested Cormorant *Phalacrocorax auritus* nests containing non-egg objects were located on the periphery of the colony, which are more likely to be attended by subadults (Siegel-Causey & Hunt 1986, Kharitonov & Siegel-Causey 1988). The atypical structure and microhabitat may indicate that the birds were inexperienced, but we have no evidence to confirm this. Also, unlike in the case of cormorants, the dowitcher nest contained solely non-egg objects. Another possibility is that prior to our discovery, the birds had one or more eggs in the nest, which were subsequently depredated. The birds may have collected the nearby objects, as if rolling eggs back into the nest. Although this possibility seems perhaps unlikely, we cannot entirely exclude it.

It remains unclear why the dowitcher incubated this unusual clutch, and why it used an atypical nest and habitat considering more suitable nesting habitat was available. Whereas there are plausible explanations for incubation of non-egg objects resembling the bird's egg in shape or size, or for incubation of foreign objects along with real eggs, incubation of a 'clutch' composed solely of non-egg objects that do not even resemble the actual eggs of the species remains puzzling.

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References

Ashkenazie S. & Safriel U.N. 1979. Breeding cycle and behavior of the Semipalmated Sandpiper at Barrow, Alaska. Auk 96: 56–67.

Blus L.J. & Henny C.J. 1980. Canada geese incubate eggs laid in previous years. Western Birds 11: 112.

Brandt H. 1943. Alaska Bird Trails. Bird Research Foundation, Cleveland, OH.

Cogswell H.L. 1977. Water Birds of California. Univ. of California Press, Berkeley.

Conover M.R. 1985. Foreign objects in bird nests. Auk 102: 696–700.

Coulter M. 1980. Stones: an important incubation stimulus for gulls and terns. Auk 97: 898–899.

Crawford R.D. 1974. Incubation of an Adelie Penguin egg by a South Polar Skua. Notornis 21: 262–263.

Glutz von Blotzheim U.N. 1999. Handbuch der Vögel Mitteleuropas Band 6: Charadriiformes (1. Teil). Aula-Verlag, Wiesbaden.

Guay P.-J., Gregurke J. & Hall C.G. 2006. A Black Swan incubating glass bottles. Aust. Field Ornithol. 23: 50–52.

Hanson W.C. & Eberhardt L.L. 1971. A Columbia River Canada Goose population, 1950–1970. Wildlife Monogr. 28: 3–61.

Hobson K.A. 1989. Pebbles in nests of Double-crested Cormorants. Wilson Bull. 101: 107–108.

Johnson S.R. & Herter D.R. 1989. The Birds of the Beaufort Sea. BP Exploration (Alaska) Inc., Anchorage.

Kessel B. 1989. Birds of the Seward Peninsula, Alaska. Univ. of Alaska Press, Fairbanks.

Kharitonov S.P. & Siegel-Causey D. 1988. Colony formation in seabirds. In: Johnston R.F. (ed.) Current Ornithology. Plenum Press, New York, pp. 223–272.

Knight R.L. & Erickson A.W. 1977. Objects incorporated within clutches of the Canada Goose. Western Birds 8: 108.

Lorenz K. & Tinbergen N. 1938. Taxis and instinctive action in the egg-retrieving behavior of the Greylag Goose [Transl. from German]. In: Schiller C.H. (ed.) 1957. Instinctive behavior. University Press, New York, pp. 176–208.

Mellink E. 2002. Pseudo-eggs of Brown *Sula leucogaster* and Blue-footed *S. nebouxii* Boobies in the Gulf of California, Mexico. Mar. Ornithol. 30: 43–44.

Pitelka F.A. 1950. Geographic variation and the species problem in the shore-bird genus Limnodromus. University of California Press, Berkeley.

Siegel-Causey D. & Hunt G.L. 1986. Breeding-site selection and colony formation in Double-crested and Pelagic Cormorants. Auk 103: 230–234.

Simmons K.E.L. 1952. The nature of the predator-reactions of breeding birds. Behaviour 4: 161–171.

Sugden J.W. 1947. Exotic eggs in nests of California gulls. Condor 49: 93–96.

Takekawa J.Y. & Warnock N. 2000. Long-billed Dowitcher (*Limnodromus scolopaceus*). In: Poole A. (ed.) The Birds of North America Online. Cornell Lab of Ornithology, Ithaca. http://bna.birds.cornell.edu/bna/species/493.

Twomey A.C. 1948. California Gulls and exotic eggs. Condor 50: 97–100.

Samenvatting

Het is welbekend dat vogels naast hun eieren soms ook op andere voorwerpen kunnen broeden. Gevallen waarbij het nest alleen vreemde voorwerpen bevat, zijn echter zeldzaam. In dit artikel wordt de waarneming beschreven van een Grote Grijze Snip *Limnodromus scolopaceus* die een nest bebroedde dat uitsluitend botjes van een zoogdier bevatte. Deze waarneming uit Alaska is het eerste beschreven geval van een vogel die een 'legsel' bestaande uit botjes bebroedt. Het broedgedrag van deze vogel lijkt niet bij te dragen aan de voortplantingskansen van de soort. De auteurs bespreken meerdere verklaringen voor het gedrag. (JP)

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