ORNIS SVECICA 8:83–86, 1998 https://doi.org/10.34080/os.v8.22947

A dwarf Atlantic Puffin fledgling *Fratercula arctica* from Nólsoy, Faeroe Islands

LECH STEMPNIEWICZ

Abstract

An unusually small Atlantic Puffin fledgling *Fratercula arctica* was found on Nólsoy, Faeroe Islands, in August 1997. The bird was fully feathered with no down remnants and left the colony during the peak of the fledging period. Some of its measurements (those where feather length is crucial, such as wing and tail) fell within the range of minimal values found in young puffins fledging prematurely. Others, like bill and tarsus lengths with a prevailing skeletal component, were less than the lowest known values. Very small body size seems to account for the very low body mass of the bird. However, proportionally developed pectoral muscles as well as the bird's overall good appearance (fully feathered with no down) and behaviour indicated that it apparently was not food stressed or starving.

Lech Stempniewicz, Department of Vertebrate Ecology & Zoology, University of Gdańsk, Legionów 9, 80-441 Gdańsk, Poland.
e-mail: biols@univ.gda.pl

Received 12 October 1998, Accepted 30 October 1998, Editor: Å. Lindström

Introduction

Lightweight and small Atlantic Puffin *Fratercula arctica* fledglings are uncommon, but do occur regularly. They tend to be related to late-hatched young and/or poor food conditions. Under either or both conditions, many young fledge prematurely still with considerable down present, especially on head, neck and rump, and with poorly grown primaries. Some others, however, remain in their burrows much longer, growing feathers and depart fully feathered albeit lightweight. Condition at fledging depends on prevailing conditions at sea during the chick-rearing period (Nettleship 1972, Gaston 1985, Birkhead & Harris 1985, Harris & Birkhead 1985). Long-lasting poor feeding conditions in Norwegian coastal waters, owing to the collapse of the herring stock, have adversely influenced the large puffin colonies on Røst and Bleik islands. Most young birds survived only for a short period and then died before fledging; the few that did fledge did so very late in the season and departed with a smaller than normal body size (Anker-Nielssen 1987, Barrett et al. 1985, Barrett & Rikardsen 1992). There is no information in the literature concerning very small, fully-feathered puffin fledglings leaving their natal burrow on time.

Study area and methods

Nólsoy (61° 59'N, 06° 38'W) is one of the 18 Faeroe Islands. A large puffin colony comprising 30–50 000 breeding pairs is situated on the SE part of the island, about 8 km from the village of Nólsoy. Traditionally, puffins are hunted during the chick-rearing period (July-August). Our study focused on timing and condition of puffin chicks at fledging. Eleven nights were spent in the colony from 6 to 16 August 1997. Puffin fledglings leaving the colony by flying were caught in mist nets and those walking to the seashore were collected by placing a net barrier across the route used to reach the sea.

Results and discussion

An apparently healthy and completely feathered puffin fledgling with an unusually small body size was caught on 14 August 1997 on Nólsoy (Faeroe Islands) as it flew towards the sea. The bird was fully feathered with no down remnants occurring, a condition that is normally attained by only early-hatched young (only c. 10% of fledglings caught in 1997 lacked down remnants). This means that its plumage development was well advanced, even though its wing and tail were relatively short but well within

the range of minimal values found in late-hatched young puffins that fledge prematurely. Measurements with a prevailing skeletal component, such as bill and tarsus lengths, fall below the lowest known values (Table 1). The first impression was that the bird was strikingly slender. Small body size certainly influenced its low body mass. However, proportionally developed pectoral muscles as well as its overall healthy appearance and vigorous behaviour indicated that it apparently was not starving or suffering from malnutrition. According to information from local ornithologist J-K. Jensen, food conditions at the Nólsoy colony were relatively good in the summer of 1997 and most birds fledged about 10 days earlier than normal. The bird left the colony during peak fledging (10–16 August 1997) and was therefore not a late-hatched chick. When released, the bird could fly very well and departed towards the open sea. Late-hatched fledglings which depart the colony prematurely can rarely fly for more than a few meters in distance.

Fledging mass of young puffins varies, largely depending on geographic location, year, time of hatching, and food availability during the chick-rearing period. Like adult puffins, fledglings tend to be, on average, smaller in southern populations (e.g. Faeroes) and larger in northern ones (e.g. NW Norway). Mean fledging mass ranges from 228.1 g (SD=24.1, N= 193) in Faeroese puffins (L. Stempniewicz, unpubl. data) to 361.0 g (SD=31.6, N=33) in those from Funk Island, Newfoundland (Nettleship 1972). Feeding rate, however, is related to the actual availability of prey, parental effort and skill in food provisioning, the intensity of gull kleptoparasitism, etc., and apparently influences fledgling body weight in all populations (Nettleship 1972, Ashcroft 1979, Harris 1980, Brown & Nettleship 1984, Birkhead & Harris 1985, Nettleship 1991, Barrett & Rikardsen 1992, Barrett 1996).

Frequently, small young puffins leave their burrows prematurely because of insufficient food being delivered by parents, normally caused by a decrease in food availability. However, such birds are always covered with down and have undeveloped primaries and rectrices. It is theoretically possible that this particular nestling hatched very early but was reared by a single parent (another one could be lost to human predation) and therefore fed at low rate. Brood manipulation experiments in puffins (consisting in adding extra chick or removing one parent bird) show that some of such broods were successful (Nettleship 1972, Corkhill 1973, Harris 1978, Ashcroft 1979). Instead of leaving the nest prematurely the chick could take an extended time to fledge and

Table 1. Minimal values of certain measurements of Atlantic Puffin fledglings from different colony locations in the North Atlantic.

Minimivärden för vissa mått hos flygga ungfåglar av lunnefågel från olika colonier i norra Atlanten.

Year *År*	Colony *Koloni*	Mass (g) *Massa*	Tarsus (mm) *Tars*	Bill (mm) *Näbb*	Tail mm) *Stjärt*	Wing (mm) *Vinge*	Comments *Kommentarer*	Reference *Referens*
1997	Nólsoy I.	125.0	21.0	24.0	32.0	122.0	fully feathered *fullt utfjädrad*	this study *denne studie*
1997	Nólsoy I.	115.0	26.0	27.5	28.0	115.0	premature fledging: very thin, starving, downy *utflugen i förtid: mycket mager, svältande, dunig*	L. Stempniewicz, unpubl. *opublicerat*
1997	Nólsoy I.	172.0	25.0	27.0	35.0	122.0	premature fledging, downy *utflugen i förtid, dunig*	L. Stempniewicz, unpubl. *opublicerat*
1996	Bleik I.	195.0	28.5	31.0	30.0	123.0	premature fledging, downy	L. Stempniewicz, unpubl. *opublicerat*
1996	Bleik I.	170.0	29.0	28.5	31.0	117.0	premature fledging, downy	L. Stempniewicz, unpubl.
1982	Bleik I.	255.0	–	–	–	–	Minimum	Barrett & Rikardsen 1992
1969	Great I.	137.0	–	–	–	130.0	minimum (1967-69)	Nettleship 1972

Note: " – ", no data available.

allocating energy to growth of certain body parts selectively. When food intake is reduced growth rate is depressed for all body parts but the wing grows preferentially (Øyan & Anker-Nilssen 1996, Rodway 1997). As a result the fledgling was very light and tiny but healthy and capable to fly, having relatively long wings. If true, this could be considered as an alternative fledging strategy of young puffins in the condition of extreme food shortage.

Measurements of this dwarf fledgling from Nólsoy and some other small-sized young puffins caught on Nólsoy and Bleik (NW Norway) are compared in Table 1. Data from the literature concerning minimal body size of puffin fledglings are also cited for comparison.

Small size (especially skeletal and mass) may indicate a genetic and/or embryonic abnormality, but that happens extremely rarely (based upon the absence of such records in the auk literature). All of this suggests that the small and fully feathered puffin fledgling caught at Nólsoy on 14 August 1997 was unusually tiny in body size and mass for the species.

Acknowledgements

Financial support for this study was provided by the University of Gdańsk grant no BW 1440-5-0247-7. I would like to extend thanks to my friends working in the field, L. Iliszko, M. Remisiewicz and S. Fryderyk, as well as to J-K. Jensen for hosting us on Nólsoy. David Nettleship has kindly commented on the record.

References

Anker-Nielssen, T. 1987. The breeding performance of puffins *Fratercula arctica* on Rost, northern Norway in 1979–1985. *Fauna norv. Ser. C, Cinclus* 10: 21–38.

Ashcroft, R.E. 1979. Survival rates and breeding biology of puffins on Skomer Island, Wales. *Ornis Scand.* 10: 100–110.

Barrett, R.T. 1996. Prey harvest, chick growth and production of three seabird species on Bleiksoy, North Norway during years of variable food availability. *Can. Wildl. Serv. Occ. Paper* 91: 20–26.

Barrett, R.T., Anker-Nielssen, T., Rikardsen, F., Valde, K., Rov, N. & Vader, W. 1985. The food, growth and fledging success of Norwegian puffin chicks *Fratercula arctica* in 1980–1983. *Ornis Scand.* 18: 73–83.

Barrett, R.T. & Rikardsen, F. 1992. Chick growth, fledging periods and adult body mass loss of Atlantic Puffins *Fratercula arctica* during years of prolonged food stress. *Colon. Waterbirds* 15: 24–32.

Birkhead, T.R. & Harris, M.P. 1985. Ecological adaptations for breeding in the Atlantic Alcidae. Pp. 205–232 in: Nettleship D.N. and T.R. Birkhead (eds.) *The Atlantic Alcidae.* Academic Press, London.

Brown, R.G.B. & Nettleship, D.N. 1984. Capelin and seabirds in the northwest Atlantic. Pp. 184–194 in: Nettleship, D.N., G.A. Sanger and P.F. Springer (eds.) *Marine birds: their feeding ecology and commercial fisheries relationships.* Canadian Wildlife Service Special Publication, Environment Canada, Ottawa.

Corkhill, P. 1973. Food and feeding ecology of puffins. *Bird Study* 20: 207–220.

Gaston, A.J. 1985. Development of the young in the Atlantic Alcidae. Pp. 319–354 in: Nettleship, D.N. and T.R. Birkhead (eds.) *The Atlantic Alcidae.* Academic Press, London.

Harris, M.P. 1978. Supplementary feeding of young puffins Fratercula arctica. *J. Anim. Ecol.* 47: 15–23.

Harris, M.P. 1980. Breeding performance of puffins *Fratercula arctica* in relation to nest density, laying date and year. *Ibis* 122: 193–209.

Harris, M.P. & Birkhead, T.R. 1985. Breeding ecology of the Atlantic Alcidae. Pp. 155–204 in: Nettleship, D.N. and T.R. Birkhead (eds.) *The Atlantic Alcidae.* Academic Press, London.

Nettleship, D.N. 1972. Breeding success of the Common Puffin (*Fratercula arctica* L.) on different habitats at Great Island, Newfoundland. *Ecological Monographs* 42: 239–268.

Nettleship, D.N. 1991. The diet of Atlantic Puffin chicks in Newfoundland before and after the initiation of an international capelin fishery, 1961–1984. Pp. 2263–2271 in: Furness, R.W. and D.N. Nettleship (eds.) Seabirds as monitors of changing marine environments. *Acta XX Congr. Int. Orn.*, 2563 pp.

Øyan, H.S. & Anker-Nilssen 1996. Allocation of growth in food-stressed Atlantic Puffin chicks. *Auk* 113: 830–841.

Rodway, M.S. 1997. Relation between wing length and body mass in Atlantic Puffin chicks. *J. Field Ornithol.* 68: 338–347.

Sammanfattning

En dvärgartad flygg ungfågel av lunnefågel Fratercula arctica *från Nólsoy, Färöarna*

Lätta och små flygga ungfåglar av lunnefågel är ovanliga men förekommer regelbundet. Vanligen kan de knytas till sena häckningar och/eller dåliga födobetingelser. Dessa ungfåglar lämnar boet i förtid fortfarande med mycket dun kvar på huvudet, halsen och övergumpen och med dåligt utvuxna vingpennor. En del andra stannar dock i bohålan längre, blir fullfjädrade trots låg vikt. Dålig födotillgång till havs har länge drabbat norska kustvatten beroende på en kollaps av sillbeståndet. På öarna Röst och Bleik har de flesta ungarna bara överlevt en kort tid. De som har blivit flygga har flugit ut mycket sent på säsongen. Det finns inga uppgifter i litteratu-

ren om mycket små, helt fullfjädrade lunnefågelsungar som lämnat sina bohålor vid normal tid.

På Nólsoy på Färöarna finns en lunnekoloni med 30–50.000 par. Vi studerade denna koloni under tiden 6 till 16 augusti 1997. Vi fångade ungarna när de lämnade kolonin antingen med nät när de flög ut eller på stranden när de gick ut till vattnet.

Den 14 augusti fångade vi en unge som var ovanligt liten men fullt befjädrad och helt utan dunrester. Vi mätte fågeln och fann de mått som ges i Tabell 1 i jämförelse med andra små individer från olika kolonier. Det första intrycket var att fågeln var påtagligt tunn. Men vi fann att flygmusklerna var helt proportionerligt urvecklade och fågeln gav intryck av full hälsa. Dess livliga beteende tydde på att den inte svalt eller led av undernäring. Enligt lokala uppgifter var födotillgången just 1997 förhållandevis god och ungen lämnade kolonin samtidigt med övriga ungar ungefär tio dagar tidigare än normalt. Det rörde sig alltså inte om någon sent kläckt unge. När vi släppte ungen flög den mycket bra ut över havet. Sent kläckta ungar som lämnar kolonin i förtid kan sällan flyga mer än några meter.

Normalt lämnar ungarna bohålan i förtid på grund av att föräldrarna inte förmår leverera tillräckligt med mat. Det är teoretiskt möjligt att denna dvärgunge faktiskt kläckte tidigt men fick dåligt med föda, kanske på grund av att den matades av bara en förälder. Men i stället för att växa med avseende på alla kroppsdelar kunde ungen låta främst vingarna och flygmuskulaturen växa (den hade långa vingar i förhållande till storleken i övrigt). Detta kan ses som en alternativ strategi under en situation av extrem födobrist. Observationerna antyder att denna fullt utfjädrade dvärgunge från Nólsoy som färdigvuxen hade ovanligt liten kroppstolek och vikt för arten.