Isolation of Campylobacter fetus subsp. jejuni from the Common Puffin (Fratercula arctica) in Norway

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Williams et al., 1976, Vet. Rec. 98: 51). Chronically infected birds have the potential for contributing to environmental contamination with this organism.

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Isolation of *Campylobacter fetus* subsp. *jejuni* from the Common Puffin (*Fratercula arctica*) in Norway

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During the past decade, the bacterial species *Campylobacter fetus* subsp. *jejuni* has emerged as an important causal agent of human enteric disease (Smibert, 1978, Annu. Rev. Microbiol. 32: 673–709; Butzler and Skirrow, 1979, Clin. Gastroenterol. 8: 737–765). Birds, especially poultry, constitute an extensive reservoir of these bacteria (Butzler and Skirrow, 1979, op. cit.). Although *C. fetus* subsp. *jejuni* has been incriminated in hepatitis in chickens and turkeys, the clinical significance of campylobacters in wild and domestic birds is largely unknown.

During the period May to June 1981, two geographically distinct populations of the common puffin (*Fratercula arctica*) in northern Norway were examined for the presence of *C. fetus* subsp. *jejuni*, *Yersinia enterocolitica* and *Salmonella* spp.

Cloacal swabs were collected from a total of 50 adult puffins on the Røst archipelago in the Lofoten Islands, Nordland County. This population has experienced several years with reproductive failure (Lid, 1980, Fauna Norv. Ser. C, Cinclus 4: 30–39). In 1975 and 1977 through 1981, chick mortality was virtually 100%. Thousands of dead nestlings were found outside the burrows.

At the Hornøya Island near Vardø, Finnmark County, cloacal swabs were collected from 26 adult puffins. This colony has had normal breeding results, with no marked mortality.

The cloacal swabs were stored in SIFF transport medium (Sandven et al., 1982, Acta Pathol. Microbiol. Scand. Sect. B 90: 73–77). Cultivation was performed within 5 days of collection. The following procedure was employed for the isolation of campylobacters:

Each sample was plated out onto chocolate agar containing defibrinated horse blood (70 ml/liter), and the following antimicrobials: colistin (10 IU/ml), cefalotin (15 μg/ml) and nystatin (25 IU/ml). All agar plates were incubated at 42–43 C in a microaerobic atmosphere, using the GasPak system (Baltimore Biological Laboratories, Cockeyville, Maryland 21030, USA) without catalyst. The plates were examined after 48 and 72 hr. Plates showing no growth were incubated further and read after 1 wk. *Campylobacter* spp. were identified on the basis of morphological, cultural, and biochemical characters according to established criteria (Smibert, 1974, *In* Bergey's Manual of Determinative Bacteriology, Buchanan and Gibbons (eds.), Williams and Wilkins, Baltimore, Maryland, pp. 207–212).

The *Campylobacter* isolation prevalences in the two puffin populations investigated were significantly different ($\chi^2 = 16.08$; $P = 0.08 \cdot 10^{-5}$). Whereas *C. fetus* subsp. *jejuni* was recovered from 39 (78%) of 50 adult puffins captured at Røst, no isolations were made from

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26 puffins inhabiting the Hornøya Island. Neither *Yersinia enterocolitica* nor *Salmonella* spp. were encountered in this study.

All isolates, except one, belonged to the biotype NARTC (Nalidixic Acid Resistant Thermophilic Campylobacters) proposed by Skirrow and Benjamin (Skirrow and Benjamin, 1980a, J. Clin. Pathol. 33: 1122). One puffin harbored two distinct biotypes (NARTC and *C. coli*). NARTC strains have occasionally been recovered from human clinical specimens, but the clinical significance is dubious (Skirrow and Benjamin, 1980b, J. Hyg. Camb. 85: 427–442). This biotype, however, seems to be prevalent among birds associated with marine ecosystems (Kapperud and Rosef, unpubl. data; Skirrow and Benjamin, 1980b, op. cit.). The adult puffins examined were apparently healthy when captured. There is some evidence, however, that juvenile birds are more susceptible to campylobacteriosis than adults (Ruiz-Palacios et al., 1981, Infect. Immun. 34: 250–255).

A causal relationship between chick mortality and campylobacter infection cannot be established at the present time. The critical factor responsible for the mortality was most probably a substantial reduction in the food supply (Lid, 1980, op. cit.). However, the possibility that bacterial infections may have contributed to increased mortality cannot be excluded. Latent infections may become manifest under conditions of stress due to starvation.

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Abdominal Hernia in a Moose from Alaska

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An adult female moose (*Alces alces*) with a large (25–30 cm diameter) spherical mass centrally located on its abdominal wall was observed by several persons in an area 5–8 km north of Fairbanks, Alaska during the period from autumn 1980 through winter 1981–1982. A calf moose was seen with this cow on several occasions during autumn 1980. Several unsuccessful attempts were made to collect this animal for scientific study. The author trailed the moose for 2 hr on November 20, 1981. Two "beds" were located. Each appeared normal except that the snow had melted down to the bare ground where the ventral mass had been situated. After the moose had walked for 20 min and run 200 m, the mass appeared hyperemic when seen from a distance of 50 m. The animal browsed and walked normally. It moved over obstacles up to 1 m high without any apparent difficulty. On January 10, 1982 the moose was shot by a member of the public at the direction of the Alaska Department of Fish and Game.

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At necropsy, the mass was found to be a hernia located on the ventral mid-line. Normal hair extended down 2–3 cm on the exterior of the hernia; the remainder was denuded of hair. The skin surrounding the hernia was thickened, and the underlying tissue was fibrous in nature. Both of these latter characteristics are similar to reports of hernias in white-tailed deer (Wobeser and MacLennan, 1971, J. Wildl. Dis. 7: 1–2; Schlegel et al., 1972, J. Wildl. Dis. 8: 320). Debris such as spruce needles, grass, twigs, etc., was both imbedded in and adhered to the skin covering the hernia. The hernia involved the rectus abdominis muscle and the abdominal aponeurotic insertion of the internal abdominal oblique, external abdominal oblique, and transversus muscles. A portion of the rumen occupied the anterior half of the hernia. The posterior portion was filled with several loops of small intestine, one of which was adhered to the interior wall of the hernia. Both of these segments of the gastrointestinal tract were filled with typical contents and appeared to be functioning normally. The animal was not pregnant at the time of collection. Standard fat deposits (sub-