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coons may be of increasing importance as reservoirs for RV particularly in the southeastern USA (Kappus et al., 1970, op. cit.). Absence of clinical disease and RV antibody suggests that rabies does not frequently occur in this population. Rabies virus antibody develops relatively soon in animals after exposure to the virus and is readily detectable by the IFAT (Coe and Bell, 1977, Infect. Immun. 16: 915–919).

The significance of low antibody titers found in a few animals to CPV and CAV1 is not clear. The former is associated with severe disease in dogs but antibody titers in convalescent dogs are usually high (Potgieter et al., 1981, op. cit.). Low antibody levels can be observed very early after infection (Potgieter et al., 1981, op. cit.) and conceivably after an interval of several months or years after infection. Since the IFAT does not discriminate between strains of CPV or distinguish this virus from feline panleukopenia virus (Potgieter et al., 1981, op. cit.), our results suggested that the latter was not prevalent in this population.

Studies of CAV1 in dogs and ranch foxes have been extensive but little is known about this virus in other wildlife (Cabasso, 1970, op. cit.). However, serologic surveys suggest that this virus occurs naturally in raccoons (Jamison et al., 1973, J. Wildl. Dis. 9: 2–3; and Parker et al., 1961, J. Am. Vet. Med. Assoc. 138: 437–440). Apparently the raccoons in Cades Cove are not exposed frequently to CAV1.

The low prevalence and titers of antibodies suggested that the viruses which were surveyed were probably not endemic in this raccoon population. Thus, this raccoon population did not appear to serve as an important reservoir for these viruses at the time studied.

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Microbiological Observations on Two Stranded Live Whales[1]

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Much has been written regarding strandings of cetaceans in different areas (Hall et al., 1971, J. Wildl. Dis. 7: 324–327; Duguy, 1978, Aquat. Mamm. 6: 9–13; Irvine et al., 1979, Fish. Bull. 77: 511–513) but causes for the phenomenon remain unclear (Geraci, 1978, Oceanus 21: 38–47). Microbial disease is often suggested. Unfortunately, little information is available on the types of microorganisms associated with healthy cetaceans to compare with data from debilitated animals. Clearly, more studies are needed to define which microbes are associated with both wild and recently stranded animals. It is also necessary to know if microorganisms associated with healthy or diseased animals are potentially zoonotic (Johnston and Fung, 1969, J. Occup. Med. 11: 276–277;

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Johnston and Fung, 1970, *In* Proceedings of the Seventh Annual Conference on Biological Sonar and Diving Mammals, Poulter (ed.), Stanford Research Institute, Menlo Park, California, pp. 191–216; Streitfeld and Chapman, 1976, Am. J. Vet. Res. 37: 303–305; Smith et al., 1978, J. Am. Vet. Med. Assoc. 173: 1131–1133). This study describes some microbiological observations made on two species of whales from separate geographical areas.

Swabs (Culturette; Marion Scientific Corp., Kansas City, Missouri 64114, USA) were used to obtain all samples and were refrigerated until processed in the laboratory within 2 hr, except for those taken from the pygmy sperm whale which were air-mailed. Cultures were taken at a blowhole depth of approx. 10 cm and a similar insertion was made in the anus. Swabs were used to inoculate directly plates of trypticase-soy agar (BBL Microbiological Systems, Cockeysville, Maryland 21030, USA) containing 5% horse blood, Sabouraud Dextrose agar (BBL) with 150 mg/liter chloramphenicol, and EMB agar (Difco Laboratories, Detroit, Michigan 48232, USA). All were incubated at 37 C for 48 hr. Bacteria and yeasts isolated were maintained on trypticase-soy and Sabouraud dextrose agar slants, respectively. Gram negative bacteria were identified using API 20E strips (Analytab Products, Plainview, New York 11803, USA). Gram positive bacteria were characterized by conventional morphological and biochemical tests. Yeasts were identified using either API 20C strips (Analytab Products) or the Uni-Yeast Tek system (Flow Laboratories, Roslyn, New York 11576, USA).

On 11 January 1983, a live, unweaned 1.5-m female pygmy sperm whale (*Kogia breviceps*) washed up on a beach on Longboat Key near Sarasota, Florida. The animal was transported to the Mote Marine Laboratory in Sarasota where swabs were taken from the blowhole and an external skin lesion which appeared to be a local abrasion, probably associated with stranding. The whale remained at the Mote Laboratory for several hr and was then trucked to Sea World in Orlando where it died less than 24 hr later. Bacteria isolated from the blowhole were *Enterobacter agglomerans*, *Pseudomonas cepacia*, and species of *Bacillus* and *Flavobacterium*. No yeasts were recovered. The skin lesion yielded cultures of a fluorescent pseudomonad, *Pseudomonas maltophila*, *E. cloacae*, and a member of CDC group V E-1 (probably a *Citrobacter*). Several yeasts recovered from the lesion included *Rhodotorula pallida*, *R. rubra*, and species of *Torulopsis* and *Aureobasidium*.

On 16 November 1982, approximately 65 pilot whales (*Globicephala melaena*) stranded at Wellfleet, Massachusetts, on Cape Cod. Most were dead when rescue personnel arrived the next day but a live 3-m juvenile female was transported to Mystic Marinelife Aquarium in Mystic, Connecticut, and kept in the water system described previously (Dunn et al., 1982, J. Am. Vet. Med. Assoc. 181: 1316–1321). The whale was euthanized 1 mo later.

Swabs were obtained from the anus and blowhole upon arrival at Mystic and five times thereafter during confinement and at necropsy. *Escherichia coli*, *Proteus mirabilis* and fecal streptococci were recovered from anal cultures before the animal was introduced into captivity. These bacteria, in addition to *Morganella morganii* and *Vibrio alginolyticus* and the yeast *Candida guilliermondii* were found in later anal samples.

Initial blowhole cultures included *V. alginolyticus*, *Pseudomonas putrefaciens*, *Moraxella* sp., and an unidentified Gram negative rod resembling the *Pseudomonas - Moraxella - Flavobacterium - Alcaligenes-Achromobacter* group. Subsequent cultures showed the presence of a nonpigmented *Staphylococcus*, fecal streptococci, *Citrobacter freundii*, *E. cloacae*, *Pseudomonas aeruginosa*, and *P. mirabilis*. The latter two, which are found often in compromised hosts (Finegold and Mar-

tin, 1982, Diagnostic Microbiology, Mosby, St. Louis, Missouri, 705 pp.), were encountered most commonly in the later stages of life and were the only bacteria isolated at necropsy from the mesenteric lymph node, gastrosplenic lymph node, and a granulomous area of the left lung. The latter was associated with macroparasite encystment and was not of bacterial origin.

No particular significance can be attached to the occurrence of any bacteria found associated with the sperm whale. These organisms, or similar ones, have been reported in apparently healthy dolphins and pinnipeds (Johnston and Fung, 1970, op. cit.; Asper and Odell, 1980, H/SWRI Tech. Rept. No. 80-122, Hubbs/Sea World Research Institute, Orlando, Florida, 181 pp.; Vedros et al., 1982, J. Wildl. Dis. 18: 447–456) and were assumed to be a portion of the normal flora.

The pilot whale presented a somewhat different microbiological profile. The several enteric bacteria (i.e., *Escherichia*, *Proteus*) and fecal streptococci, *Pseudomonas* species, and *Pseudomonas*-like organisms found initially as well as those isolated later (other pseudomonads, *C. freundii*, *E. cloacae*, *C. guilliermondii*) also were not considered unusual, compared with the other animal studied here or reports in the literature. However, a few other bacteria encountered merit comment. *Vibrio alginolyticus* is common in the marine environment and has been associated with a variety of human infections (Blake et al., 1980, Ann. Rev. Microbiol. 34: 341–367) as have species of *Moraxella* (Rubin et al., 1980, *In* Manual of Clinical Microbiology, Lennette (ed.), American Society for Microbiology, Washington, D.C., pp. 263–287). *Staphylococcus* has been found in healthy marine mammals and as a causative agent of meningoencephalitis in whales (Medway, 1979, Aquat. Mamm. 6: 99–100) and dolphins (Colgrove and Migaki, 1976, J. Wildl. Dis. 12: 271–274). Some strains are serious pathogens in humans. *Pseudomonas aeruginosa* is well-known as an opportunistic pathogen in humans (Bodey et al., 1983, Rev. Infect. Dis. 5: 279–313) and apparently is common in marine animals but also can be pathogenic (Diamond et al., 1979, J. Am. Vet. Med. Assoc. 175: 984–987). Cowan (1966, Arch. Pathol. 82: 178–179) described bacteria isolated from diseased tissue in necropsies on 55 wild but apparently healthy pilot whales. Aerobes found included *E. cloacae*, *P. vulgaris*, *E. coli*, and species of *Aeromonas*, *Pseudomonas*, *Staphylococcus*, and fecal streptococci. This suggests that marine mammals, like humans, harbor a commensal microflora that, under normal conditions, poses no health threat to the host. However, stress, debilitation, and stranding may perhaps predispose the animal to infection by these or other microorganisms encountered in the environment. Use of antibiotics and/or immunosuppressants in captive cetaceans may alter the resident microflora in favor of opportunists (Dunn et al., 1982, J. Am. Vet. Med. Assoc. 181: 1316–1320). The notations herein provide some information on microorganisms found in young, albeit not healthy, whales and supplements the extant literature with respect to microbes associated with these animals in nature. Caution should be exercised by personnel who handle stranded animals to prevent exposure to bacteria that are potentially hazardous to humans.

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