

# Occurrence of infectious bacteria in captive-reared Kemp's ridley (*Lepidochelys kempii*) and loggerhead (*Caretta caretta*) sea turtles.

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**Abstract.** -- Specimens of Kemp's ridley and loggerhead sea turtles which died during captive rearing (1984 to 1996) were subjected to complete necropsy. Seven different bacterial strains were isolated and identified from Kemp's ridleys and three strains from loggerheads. *Salmonella* spp., *Aeromonas* spp. and *Pseudomonas* spp. were found in both species.

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The National Marine Fisheries Service (NMFS) Galveston Laboratory has reared Kemp's ridley (*Lepidochelys kempii*) and loggerhead (*Caretta caretta*) sea turtles in captivity from 1978 to the present (Fontaine et al. 1985; Caillouet 1987). Kemp's ridley hatchlings were received from Rancho Nuevo, Tamaulipas, Mexico or Padre Island National Seashore, Corpus Christi, Texas and were reared until release into the Gulf of Mexico (Caillouet et al. 1995). Loggerhead hatchlings were received from Clearwater Marine Science Center in Clearwater, Florida or Mote Marine Laboratory in Sarasota, Florida and were reared for turtle excluder device (TED) certification trials and released into the Gulf of Mexico. From 1978 to 1983, Galveston Laboratory personnel isolated bacteria from sick turtles and necropsied turtles that died in captivity, and the bacteria identified were reported elsewhere (Clary & Leong 1984; Leong et al. 1989).

This study was undertaken to compile data on the occurrence of infectious bacteria from necropsied Kemp's ridleys and loggerheads of the 1984-1996 year-classes. The data were gathered to identify potentially pathogenic bacteria for biologists and veterinarians rearing and treating sea turtles in captivity.

## METHODS AND MATERIALS

From 1984 through 1996, 16,042 specimens of Kemp's ridley hatchlings were received alive at the NMFS Galveston Laboratory. Of these, 938 (5.8%) died; 116 specimens of these were necropsied. From 1987 through 1996, 1,447 specimens of loggerhead hatchlings were also received. Of these, 117 (8.8%) died; 32 specimens of these were necropsied and four sick turtles were examined by rectal swab. Specimens were sent to the Texas Veterinary Medical Diagnostic Laboratory (TVMDL) in College Station, Texas for complete necropsy. Additional turtles that died were not necropsied, either because they had undergone postmortem decomposition or were fixed in formalin for other purposes. Healthy turtles were not sampled for the presence of

bacterial infections.

## RESULTS AND DISCUSSION

The most common bacterial isolates from Kemp's ridleys were *Salmonella* spp. (41.3%; Table 1). An outbreak of *Salmonella* spp. in the 1987 year-class of Kemp's ridleys accounted for most of this occurrence. These bacteria were found in turtles as young as three to nine days post hatch and as old as 10-12 months. *Salmonella* spp. were found in the yolk sacs and intestines in younger animals and in intestines of older animals. The second most frequent isolates from Kemp's ridleys were *Aeromonas* spp. (11.2%). The intestine was the source of most of the bacterial isolates from Kemp's ridley, followed by the yolk sac, body cavity and lung. No infectious bacteria were isolated from 18.2% of the necropsied Kemp's ridleys.

The bacteria most frequently isolated from loggerheads were *Aeromonas* spp. (19.4%; Table 1). *Salmonella* spp. had the second highest occurrence in loggerheads (8.3%). The intestine and rectal swabs accounted for most of the bacterial isolates from loggerheads. No infectious bacteria were isolated from 66.7% of the loggerheads.

The bacteria isolated and reported here are potentially pathogenic to all sea turtles. The outbreak of *Salmonella* spp. infections in the 1987 year-class Kemp's ridleys suggests a detrimental effect of pathogenic organisms on a captive population. *Aeromonas* spp. were reported by Sinderman (1977) as being common in marine waters and might be pathogenic to animals living under environmental stress. Pasquale et al. (1994) isolated *Aeromonas hydrophila* in turtles (*Pseudemys scripta*) that had a 95% mortality rate. Other researchers (Stickney et al. 1973; Leong et al. 1989) isolated *Aeromonas* spp., *Proteus* spp., *Pseudomonas* spp. and *Citrobacter* spp. from Kemp's ridley and loggerhead hatchlings.

Most of the sea turtle pathology research done at the NMFS Galveston Laboratory took place during the early years of the Kemp's ridley head-start experiment from 1977 to 1983 (Clary & Leong 1984; Leong et al. 1989). Improvement of sea turtle husbandry techniques over the years raised the survival rates after 1983 (Clary & Leong 1984; Fontaine et al. 1985). Since no attempts were made to isolate bacteria from healthy turtles, one cannot conclude from this data that the bacteria isolated was in fact the cause of death. To verify pathogenic bacteria, healthy turtles will need to be tested for the presence of microorganisms.

Diagnosing infected turtles and isolating the bacteria are critical for proper treatment of individuals, and to prevent disease outbreaks in captive populations. Even with improved husbandry practices, sea turtles reared in captivity are still subject to bacterial infections. However, the high survival rates in sea turtles reared in captivity at the Galveston Laboratory suggest that bacterial infections were not a major problem.

Table 1. Incidence of seven bacteria strains in 116 specimens of Kemp's ridley and 32 loggerhead turtles necropsied and four rectal swabs taken from sick loggerheads were analyzed at the Texas Veterinary Medical Diagnostic Laboratory.

Bacteria	Kemp's ridley (N = 116)		Loggerhead (N = 36)	
	Number	%	Number	%
<i>Salmonella</i> spp.	48	41.3	3	8.3
<i>Aeromonas</i> spp.	13	11.2	7	19.4
<i>Citrobacter</i> spp.	9	7.8	0	0.0
<i>Proteus</i> spp.	8	6.9	0	0.0

<i>Escherichia</i> spp.	7	6.0	0	0.0
<i>Pseudomonas</i> spp.	7	6.0	2	5.6
<i>Enterococcus</i> spp.	2	1.7	0	0.0

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