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COMPARATIVE PATHOLOGY LABORATORY

PAPANICOLAOU CANCER RESEARCH BUILDING - 1550 N.W. 10TH AVENUE, RM 105, MIAMI, FL 33136

ANIMAL PATHOLOGY REPORT

To: NATIONAL MARINE FISHERIES
75 VIRGINIA BEACH DRIVE
KEY BISCAVNE, FL 33149

Lab Number CP00-1913
Account No. X44461
Procedure 800909
Send via FAXMAIL

Date Received: 05/25/2000
Owner: GRAND BAHAMA
Species: ZIPHIUS CAVIROSTRIS
Breed: CUVIER'S BEAKED WHALE

Date of Report 05/26/2000
Identity Z.C. 10
Sex F
Age UNK

Final Diagnosis and Comments:

LUNG, AUTOLYSIS, SEVERE
OVARY, CORPUS, LUTEUM, FOCAL WITH AUTOLYSIS, SEVERE
MESOVARIUM, AUTOLYSIS, SEVERE
EYE, PENDING

MICROSCOPIC EVALUATION:

PRESENTED ARE MULTIPLE TISSUES FROM A FEMALE CUVIER'S BEAKED WHALE. THERE IS MARKED POST MORTEM AUTOLYSIS WHICH PRECLUDES AN IN-DEPTH HISTOPATHOLOGIC ANALYSIS. THE SECTION OF EYE REQUIRES ADDITIONAL HISTOLOGIC PROCESSING RESULTS ARE PENDING.

RUTH EWING, DVM

PATHOLOGIST

GREGORY BOSSART, VMD, PHD

Pathologist



DEPARTMENT OF DEFENSE
ARMED FORCES INSTITUTE OF PATHOLOGY
WASHINGTON DC 20306-6000



REPLY TO
ATTENTION OF

May 23, 2000

2729873 00
ANIMAL, CETACEAN WHALE
Zc #10 T
BI/TPL/DFF/NTS/mw

Dr. Ruth Ewing
National Marine Fisheries Service
75 Virginia Beach Drive
Miami, FL 33149

AFIP REPORT:

Zc #10 1. Lung: Edema, alveolar, acute, diffuse, moderate, with congestion, Cuvier's beaked whale, (*Ziphius cavirostris*), cetacean.
2. Fibrovascular tissue, with large blood vessels; corpus luteum; skeletal muscle; eye and heart: No significant lesions.

COMMENT: Advanced autolysis hampered histologic interpretation of the submitted tissues; subtle tissue changes may be obscured. The cause of death is not evident. Acute pulmonary edema and congestion are common nonspecific findings in stranded cetaceans. All tissues were severely autolytic with postmortem bacterial overgrowth. The fibrovascular tissue with large blood vessels is most likely of reproductive tract origin.

William Inskeep II, DVM, DACVP
COL, VC, USA
Chairman, Department of Veterinary
Pathology

Final Report on Stranded Beaked Whale Stomach Contents

Report prepared by William A. Walker, June 6, 2000.

I. General description of the samples: Three animals were sampled. These were the frozen contents from the stomachs of two Cuvier's beaked whales, *Ziphius cavirostris*, (Zc- #10 female; Zc- #11 male) and one intact frozen stomach from a Blainville's beaked whale, *Mesoplodon densirostris*, (Md- #12 male).

II. Sample preparation and methodology: Upon thawing, the intact stomach of Md- #12 was systematically opened beginning at the esophagus. The contents were removed through careful rinsing of the mucosal lining of all stomach chambers into a 5-liter dissecting pan. In order to separate stomach content components, each of the stomach content samples were independently flushed through a series of three interlocking stainless steel screens. The screen mesh sizes from top to bottom were 2.0 mm, 1.0 mm and 0.355 mm. All stomach content remains recovered from these screens were preserved in 50% ethanol for later microscopic examination at 6 to 10X magnification.

III. Results:

1) **Md- #12, male:** The stomach of this whale contained no prey remains. Non-prey items found included 14 small anisakid nematode worms (probably *Anisakis simplex*) ranging in length from 10-24 mm. One approx. 10 x 120mm marine plant fragment (*Zostera* sp.) and approximately 8 cc of beach matrix consisting mainly of tiny coral fragments and Foraminifera. The mucosal lining of the stomach contained no visible lesions or ulcerations. No anthropogenic material was found.

2) **Zc- #10, female:** The stomach contents provided contained small quantities of cephalopod and crustacean remains. No fish remains were found. All prey remains were in the form of isolated squid beaks, squid eye lenses and portions of crustacean exoskeletons. No fleshy portions of prey remains were present. Non-prey items encountered were 23 anisakid nematodes (probably *Anisakis simplex*) ranging in length from 10 to 30 mm and a small quantity (<1 cc) of typical beach matrix. No anthropogenic material was found. The prey remains from this sample are identified as follows:

Cephalopoda

Histioteuthidae

Histioteuthis hoylei - one pair of beaks representing a single individual.

Chiroteuthidae

Chiroteuthis sp. - one pair of beaks representing a single individual.

Cranchiidae

Megalocranchia sp.- one lower beak representing one individual.

Crustacea

Oplophoridae

Acanthephyra sp. cf. *A. curtirostris* - The number of antennulae indicates a

minimum of 11 individuals are represented.

- 3) **Zc- #11, male:** The prey remains from this sample were represented by only one cephalopod beak, two squid eye lenses and portions of a crustacean exoskeleton. No fish remains were found. No fleshy remains of prey remains were present. Non-prey items encountered were 5 fragments of a marine plant (probably *Sargassum* sp.) the largest of which was approx. 10 x 25 mm. No parasitic nematodes were present. No anthropogenic was found. The prey remains from this sample are identified as follows:

Cephalopoda

Histioteuthidae

Histioteuthis hoylei – one lower beak representing one individual.

Crustacea

Oplophoridae

AcanthePHYra sp. cf. *A. curtirostris* – carapace portions from one individual.

- IV. **Discussion:** The only prey remains recovered were from the two Cuvier's beaked whales (Zc-#10 and Zc- #11). Though the numbers of prey recovered were few, the cephalopod families represented are typical for those described for many species of beaked whales (Clarke 1996). The genera represented, *Histioteuthis hoylei*, *Chiroteuthis* sp. and *Megalocranchia* sp. are known prey of Cuvier's beaked whale in both the Atlantic and Pacific Oceans (Mead and Walker unpublished data). While larval stages and juveniles are found through out the water column, adult squid of the families Histioteuthidae, Chiroteuthidae and Cranchiidae are primarily inhabitants of the meso-bathypelagic and benthic zones (Nesis 1987).

Members of the deepwater shrimp family Oplophoridae are found in the Caribbean region and are abundant at depths below 500 meters (Chace 1940). The peaked shrimp, *AcanthePHYra curtirostris*, has a bathypelagic distribution, is most abundant at 1000-1250 meters, and is not reported to undergo any pronounced diel migration in the water column (Foxton 1972). Occurrence of crustacean remains in *Ziphius* stomach contents is not uncommon. An unidentified species of deepwater shrimp is known to occur in Cuvier's beaked whales stranded on the east coast of North America (Mead and Walker unpublished data).

In summary, the prey found in the stomach of the two Cuvier's beaked whales were typical deepwater species and consistent with those previously found in stomachs of this species of cetacean.

Literature Cited

- Chace, F. A. 1940. Plankton of the Bermuda oceanographic expeditions. IX. The bathypelagic caridean Crustacea. *Zoologica* 25 (2): 117-209.
- Clarke, M. R. 1996. Cephalopods as prey. III. Cetaceans. *Phil. Trans. R. Soc. Lond. B.* 351: 1053-1065.
- Foxton, P. 1972. Observations on the vertical distribution of the genus *AcanthePHYra* (Crustacea: Decapoda) in the eastern north Atlantic, with particular reference to

species of the "purpurea" group. Proc. R. Soc. Edinburgh Sec. B. 73: 301-313.

Nesis, K. N. 1987. Cephalopods of the world. TFH Publications Inc., Neptune City, New Jersey. 351p.

Preliminary Report on Stranded Beaked Whale Stomach Contents

Report prepared by William A. Walker, May 29, 2000.

- I. **General description of the samples:** Three animals were sampled. These were the frozen contents from the stomachs of two Cuvier's beaked whales, *Ziphius cavirostris*, (Zc- #10 female; Zc- #11 male) and one intact frozen stomach from a Blainville's beaked whale, *Mesoplodon densirostris*, (Md- #12 male).
- II. **Sample preparation and methodology:** Upon thawing, the intact stomach of Md- #12 was systematically opened beginning at the esophagus. The contents were removed through careful rinsing of the mucosal lining of all stomach chambers into a 5 liter dissecting pan. In order to separate stomach content components, each of the stomach content samples were independently flushed through a series of three interlocking stainless steel screens. The screen mesh sizes from top to bottom were 2.0 mm, 1.0 mm and 0.355 mm. All stomach content remains recovered from these screens were preserved in 50% ethanol for later microscopic examination at 6 to 10X magnification.
- III. **Results:**
 - 1) **Md- #12, male:** The stomach of this whale contained no prey remains. Non-prey items found included 14 small anisakid nematode worms (probably *Anisakis simplex*) ranging in length from 10-24 mm. One approx. 10 x 120mm marine plant fragment (*Zostera* sp.) and approximately 8 cc of beach matrix consisting mainly of tiny coral fragments and foraminifera. The mucosal lining of the stomach contained no visible lesions or ulcerations. No anthropogenic material was found.
 - 2) **Zc- #10, female:** The stomach contents provided contained small quantities of cephalopod and crustacean remains. No fish remains were found. All prey remains were in the form of isolated squid beaks, squid eye lenses and portions of crustacean exoskeletons. No fleshy portions of prey remains were present. Non-prey items encountered were 23 anisakid nematodes (probably *Anisakis simplex*) ranging in length from 10 to 30 mm and a small quantity (<1 cc) of typical beach matrix. No anthropogenic material was found. The prey remains from this sample are identified as follows:

Cephalopoda

Histioteuthidae
Histioteuthis sp. cf. *H. hoylei* - one pair of beaks representing a single individual.

Chiroteuthidae
Chiroteuthis sp. - one pair of beaks representing a single individual.

Cranchiidae
Megalocranchia sp. - one lower beak representing one individual.

Crustacea

Oplophoridae

11 *AcanthePHYra* sp. - The number of antennulae indicates a minimum of individuals are represented.

3) **Zc- #11, male:** The prey remains from this sample were represented by only one cephalopod beak, two squid eye lenses and portions of a crustacean exoskeleton. No fish remains were found. No fleshy remains of prey remains were present.

Non-prey

items encountered were 5 fragments of a marine plant (probably *Sargassum* sp.) the largest of which was approx. 10 x 25 mm. No parasitic nematodes were present. No anthropogenic was found. The prey remains from this sample are identified as follows:

Cephalopoda

Histioteuthidae

Histioteuthis sp. cf. *H. hoylei* - one lower beak representing one individual.

Crustacea

Oplophoridae

AcanthePHYra sp. - carapace portions from one individual.

IV. Discussion: The only prey remains recovered were from the two Cuvier's beaked whales (Zc-#10 and Zc- #11). Though the numbers of prey recovered were few in number, the cephalopod families represented are typical for those described for beaked whales (Clarke 1996). The genera represented, *Histioteuthis* sp., *Chiroteuthis* sp. and *Megalocranchia* sp. are known prey of Cuvier's beaked whale in both the Atlantic and Pacific Oceans (Mead and Walker unpublished data). While larval stages and juveniles are found through out the water column, adult squid of the families Histioteuthidae, Chiroteuthidae and Cranchiidae are primarily inhabitants of the meso-bathypelagic and benthic zones (Nesis 1987). Members of the deepwater shrimp family Oplophoridae are abundant in the Caribbean region and are abundant at depths below 500 meters (Chace 1940). Ingestion of an unidentified species of deep water shrimp is

known to occur in Cuvier's beaked whales stranded on the east coast of North America (Mead and Walker unpublished data).

To date, Work on species identification of the cephalopod beaks and the deepwater shrimp is still in progress. In order to refine identification the specimens still need more detailed comparison with available reference material and literature. A final report on these findings will be provided by June 8, 2000.

Literature Cited

- Chace, F. A. 1940. Plankton of the Bermuda oceanographic expeditions. IX. The bathypelagic caridean Crustacea. *Zoologica* 25 (2): 117-209.
- Clarke, M. R. 1996. Cephalopods as prey. III. Cetaceans. *Phil. Trans. R. Soc. Lond. B.* 351: 1053-1065.
- Nesis, K. N. 1987. *Cephalopods of the world*. TFH Publications Inc., Neptune City, New Jersey. 351p.

Table 2A: Sample information for tissues analyzed for dioxin-like PCBs and other selected PCBs and pesticides by HPLC/PDA.

Tissue Type	Field Number	Tissue Type	Sex	Age	Sample Wt. (g)	%Lipid	Total PCBs (ng/g wet wt.)	Total CB TEQ (pg/g wet wt.)	Total DDTs (ng/g wet wt.)
	Md 03/16/00	Blubber			0.31	42.00	11300	132.45	11040
	ZC 03/17/00	Blubber			0.29	5.00	17800	220.16	25500
	ZC-M 03/18/00	Blubber	M		0.33	1.60	3170	42.36	3210
	ZC-F 03/18/00	Blubber	F		0.32	2.50	808	6.77	1007

TCDD = 1,2,3,4-tetrachlorodibenzo-*p*-dioxin

Data from the Environmental Conservation Division, Northwest Fisheries Science Center
For personnel use, not to be distributed.

Table 2B: Concentrations (ng/g, wet weight) of dioxin-like PCBs* in samples analyzed by HPLC/PDA.

	Field Number	77	106	118	120	156	157	169	170	180	189
MM0854	Md	< 0.68	140	770	< 0.65	76	19	< 0.84	330	810	5.4
MM0851	ZC	< 1	160	1300	< 0.98	130	39	< 1.3	510	1200	12
MM0852	ZC-M	< 0.91	50	270	< 0.86	18	5.8	< 1.1	140	310	2.8
MM0853	ZC-F	< 0.91	1.5	41	< 0.86	5.8	< 0.56	< 1.1	45	96	< 0.56

* The dioxin-like PCB congeners (shown in this table) have minimal interferences from co-eluting compounds which generally contribute < 10% to the total concentration.

Table 2C: Concentrations (ng/g, wet weight) of selected nondioxin-like PCBs* and pesticides in tissue samples analyzed by HPLC/PDA.

Field Number	Nondioxin-like CB Congeners					Selected Pesticides					
	101	128	138	153	190	opDDD	ppDDD	ppDDE§	opDDT	ppDDT	HCB
Md 03/16/00	2000	310	1100	1800	25	< 1.2	980	6800	660	2600	210
ZC 03/17/00	3400	400	1700	3100	34	< 1.8	2000	20000		3500	190
ZC-M	670	110	340	580	3.3	< 1.6	270	2300		640	47
ZC-F 03/18/00	190	13	91	180	1.6	7.4	110	890		< 1.8	5.1

HCB = hexachlorobenzene

§ = ppDDE analyzed at 286 nm; all other analytes analyzed at 220 nm

* The nondioxin-like PCB congeners (shown in this table) generally co-elute with other PCBs, therefore we report the PCB congener that is usually present in the greatest proportion.

| = The DDT could not be quantitated due to analytical interference with a co-eluting PCB congener or the PCB could not be quantitated due to analytical interference with a co-eluting DDT.

Data from the Environmental Conservation Division, Northwest Fisheries Science Center
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