

Date: Mon, 23 Aug 2004 09:13:10 +0200
From: Bea et Franck <beaetf@mail.pf>
To: George H. Balazs <gbalazs@honlab.nmfs.hawaii.edu>
Subject: Re: Bora news

[The following text is in the "iso-8859-1" character set.]
[Your display is set for the "US-ASCII" character set.]
[Some characters may be displayed incorrectly.]

Hello George,

> well we, the two of us, are in a difficult situation. Why? Because
> Pascal called me today and told me about hook in turtle (but he didn't
> say it was a hawksbill). And we talked and talked and he Never Said One
> Word about two turtles dying! Nothing. GB

I know Pascal was over busy when it happened and he was completely panic at
the idea of a tourist seeing the dead turtle. BEA

> Can you tell me please, what were the ID's of the two that died? The
> marks on them that we put on? GB

The one I found had 3 dots on the 4 th Lateral left. BEA

>Did Pascal ever give you the data sheets that I xeroxed from my book and
sent to him? GB

yes, thank you very much BEA

> Last, I don't think you ever answered my question about the turtle that
> was found that we didn't mark. Was it the one under the restaurant, do
> you think? Was it one of the ones that just died? GB

No, this one is called Nero, she is permantly in one of the enclosures
because she is weak and tiny. I think I told you about in one of my first
mails. She has trouble diving ; she has trouble taking correctly and
efficiently her food; she has nothing visible in her mouth but her mouth is
smelly and she does a weird sound when breathing in. BEA

> I hope that Pascal has told Miri that the two died. GB

I called her right away BEA

Thank you George for your help
Best regards
Bea

Date: Mon, 23 Aug 2004 09:15:10 +0200
From: Bea et Franck <beaetf@mail.pf>
To: George H. Balazs <gbalazs@honlab.nmfs.hawaii.edu>
Subject: Re: Bora news

[The following text is in the "iso-8859-1" character set.]
[Your display is set for the "US-ASCII" character set.]
[Some characters may be displayed incorrectly.]

I forget to answer that question

> Bea, can you be 100% absolutely Sure that no one is taking jelly fish to
> feed the turtles now??

YES , everyone knows



Date: Mon, 20 Dec 2004 11:42:21 -1000
From: cecile <cgaspar@mail.pf>
To: 'George H. Balazs' <gbalazs@honlab.nmfs.hawaii.edu>
Cc: 'Bea Tretinella' <beaetf@mail.pf>,
'Pascal Fouquet' <p.fouquet@lemeridien-borabora.com>,
'Thierry Work' <thierry_work@usgs.gov>,
'Miri TATARATA' <miri.tatarata@environnement.gov.pf>
Subject: RE : turtle 15

[The following text is in the "iso-8859-1" character set.]
[Your display is set for the "US-ASCII" character set.]
[Some characters may be displayed incorrectly.]

Turtle 15 was 1pt 2c which is one point on scute number 2 in the center, Miri, could we speed this cites permit ? thanks cecile

Dr Cécile Gaspar, vétérinaire,
17 :: Sud, Communication et environnement
B.P 1374 Papetoai 98729 Moorea
Polynésie Française
tel: 689.70.60.66
cgaspar@mail.pf

-----Message d'origine-----

Deá: George H. Balazs [mailto:gbalazs@honlab.nmfs.hawaii.edu]
Envoyéá: lundi 20 décembre 2004 11:32
Á: cecile
Ccá: Bea Tretinella; Pascal Fouquet; Thierry Work; Miri TATARATA
Objetá: Re: turtle 15

Very sad and very sorry to hear this. I want you to know (if I may "speak" for Thierry in this case) that Thierry and I are doing everything humanly possible to speed the analyses of histology and toxicology.

If the permit for the remaining turtles can be expedited, it would be very desirable to have them shipped to Honolulu as soon as possible. The more turtles Thierry is able to analyze the better chance we will have of finding an answer to the deaths. Aloha, George

Regarding Turtle "15" what dots (white marks) were on the shell (so I can match with my own notes when I visited BoraBora)?

On Mon, 20 Dec 2004, cecile wrote:

> Dear all,
> The turtle named 15 died on Thursday. It is one we received from
> Meridian Bora (Nero 2) on October 27 th. We show high weakness and no
> appetite at first, then start better for a few day, and died very
> quickly.
> Interesting to note that it is one turtle that is around 1 year old,
she
> was 1.6 kg for 24.2 ccl in nov, compared to turtle 14 for example,
same
> age who is 6.6 kg for 38 ccl.
> We did on her baytril for 15 days whn she first arrived, droncit,
> corticoid, vit A and iron.
> We keep her frozen for now.

>
> The only turtles we are watching carefully now are from Moorea,
wounded
> Blue with hole in the head and a missing eye or the large hawkbill
> Tortilla, this one eats very well squid and show better energy now!
>
> Pascal told me mast week one died Miri saw her the week end before,
> could you send us her size and weight and age?
> Thanks cecile
>
> Dr C0cile Gaspar, v0t0rinaire,
> 17 ☼ Sud, Communication et environnement
> B.P 1374 Papetoai 98729 Moorea
> Polyn0sie Francaise
> tel: 689.70.60.66
> cgaspar@mail.pf
>
>

2005

FAX FROM: CAHFS (530) 752-6253 TO: 9,1808592-8300 PAGE: 2 OF 4

Wed Jan 05 14:22:01 2005 1

Toxicology
Le Meridien
Captive Reared
Green Turtles

Final Report Printed: 01/05/05

(This report supersedes all previous reports for this accession)
FAX to :NATIONAL MARINE FISHERIES ,808 592-8300

California Animal Health & Food Safety
Laboratory System (CAHFS) - Davis
PO Box 1770
Davis, CA 95617
(530) 752-8700

ACCESSION#:D0413773
District:
County: HAWAII
Case Coordinator: RPOPPENG

Submitter
NATIONAL MARINE FISHERIES
MARINE TURLE RESEARCH
2570 DOLE ST
HONOLULU, HI 96822

Owner:
NATIONAL MARINE FISHERIES
MARINE TURLE RESEARCH
2570 DOLE ST
HONOLULU, HI 96822

Agent or Collector:
Reference Number: THIERRY WORK

Species: REPTILE
Herd/Flock ID: 17906-2/17906-3
Date Taken:
Date Received: 12/21/04

4 Specimens submitted: 2liver,2kidney

Electronically signed by:
Robert Poppenga, DVM, PHD

LABORATORY FINDINGS / DIAGNOSIS

Tissues negative for anticoagulant rodenticides and paraquat.

TOXICOLOGY

None of the anticoagulant rodenticides included in our routine screen were detected in the submitted liver samples at or above the indicated method detection limits. Paraquat was not detected in either submitted kidney sample at or above the indicated method detection limit. MDL = method detection limit (lowest concentration detectable by our

FAX FROM: CAHFS (530) 752-6253 TO: 9,1808592-8300 PAGE: 3 OF 4

Wed Jan 05 14:22:01 2005 2

CAHFS Final Report #F
01/05/05

ACCESSION#: D0413773
PAGE: 2 of 2

*** ANTICOAGULANT SCREEN

LIVER SPECIMEN.ID	MDL	Warfarin	Bromadiolone	Coumachlor	Brodifacoum
17906-2		.05 ppm	.05 ppm	.05 ppm	.01 ppm
17906-2		Not Detected	Not Detected	Not Detected	Not Detected
17906-3		Not Detected	Not Detected	Not Detected	Not Detected

LIVER SPECIMEN.ID	MDL	Diphacinone	Chlorophacinone	Difethialone
17906-2		.25 ppm	.25 ppm	.25 ppm
17906-2		Not Detected	Not Detected	Not Detected
17906-3		Not Detected	Not Detected	Not Detected

*** PARAQUAT - TISSUE/OTHER

KIDNEY SPECIMEN.ID	MDL	PARAQUAT
17906-2		0.50 ppm
17906-2		Not Detected
17906-3		Not Detected

C L I N I C A L H I S T O R Y

*****copy to George Balazs
NMFPS-Pacific Islands Science Center
2570 Dole Street
Honolulu, HI 95622

No history given.

S P E C I M E N S U M M A R Y

Specimen Type	Breed	ID	Age	Sex	Qty
LIVER	TURTLE	Multiple IDs			2
KIDNEY	TURTLE	Multiple IDs			2

Final - FEE ESTIMATE

Accession #: D0413773 Date Submitted : 21 DEC 2004
Reference #: THIERRY WORK Report Date : 05 JAN 2005

Bill To: NAT007 NATIONAL MARINE FISHERIES
Submitter: NAT007 NATIONAL MARINE FISHERIES
Owner / Ranch: NAT007 NATIONAL MARINE FISHERIES

SPECIMEN SUMMARY: Species: REPTILE
Flock / Herd Id: 17906-2/17906-3 # Animals in Group:

Specimen Type	Breed	ID	Age	Sex	Qty
LIVER	TURTLE	Multiple IDs			2
KIDNEY	TURTLE	Multiple IDs			2

This Fee Estimate is based on the tests performed. If there are differences on your statement please contact the CAHFS Business Offices (1-800-553-6878) for more information. For out of state clients call (530)-752-4613.

Current Charges:

Code	Test Name	Qty	Charge
8005	ANTICOAGULANT SCREEN	2	\$249.50
8120	PARAQUAT - TISSUE/OTHER	2	\$181.40

FAX FROM: CAHFS (530) 752-6253 TO: 9,1808592-8300 PAGE: 1 OF 4



CAHFS

From: Robert Poppenga DVM, PHD

To: NATIONAL MARINE FISHERIES OF NATIONAL MARIN

Time Sent: 14:22:02 01/05/05

Pages: 4

Regarding:

JAN 05 2005

Per.....

Final Report Printed: 01/05/05

(This report supersedes all previous reports for this accession)

* File copy of a FAXed report. *

FAX to : NATIONAL MARINE FISHERIES , 808 592-8300
Thierry Work , 808 792-9596

California Animal Health & Food Safety
Laboratory System (CAHFS) - Davis
PO Box 1770
Davis, CA 95617
(530) 752-8700

ACCESSION#: D0413773
District:
County: HAWAII
Case Coordinator: RPOPPENG

Submitter
NATIONAL MARINE FISHERIES
MARINE TURLE RESEARCH
2570 DOLE ST
HONOLULU, HI 96822

Owner:
NATIONAL MARINE FISHERIES
MARINE TURLE RESEARCH
2570 DOLE ST
HONOLULU, HI 96822

Agent or Collector:
Reference Number: THIERRY WORK

Species: REPTILE
Herd/Flock ID: 17906-2/17906-3
Date Taken:
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Robert Poppenga, DVM, PHD

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** ANTICOAGULANT SCREEN

LIVER	Warfarin	Bromadiolone	Coumachlor	Brodifacoum
SPECIMEN.ID MDL	.05 ppm	.05 ppm	.05 ppm	.01 ppm
17906-2	Not Detected	Not Detected	Not Detected	Not Detected
17906-3	Not Detected	Not Detected	Not Detected	Not Detected

LIVER	Diphacinone	Chlorophacinone	Difethialone
SPECIMEN.ID MDL	.25 ppm	.25 ppm	.25 ppm
17906-2	Not Detected	Not Detected	Not Detected
17906-3	Not Detected	Not Detected	Not Detected

** PARAQUAT - TISSUE/OTHER

KIDNEY	PARAQUAT
SPECIMEN.ID MDL	0.50 ppm
17906-2	Not Detected
17906-3	Not Detected

C L I N I C A L H I S T O R Y

*****copy to George Balazs
NMFS-Pacific Islands Science Center
2570 Dole Street
Honolulu, HI 95622

No history given.

S P E C I M E N S U M M A R Y

Specimen Type	Breed	ID	Age	Sex	Qty
LIVER	TURTLE	Multiple IDs			2
KIDNEY	TURTLE	Multiple IDs			2

Final - FEE ESTIMATE

Accession #: D0413773

Date Submitted : 21 DEC 2004

Reference #: THIERRY WORK

Report Date : 05 JAN 2005

Bill To: NAT007 NATIONAL MARINE FISHERIES
Submitter: NAT007 NATIONAL MARINE FISHERIES
Owner / Ranch: NAT007 NATIONAL MARINE FISHERIES

SPECIMEN SUMMARY:

Species: REPTILE

Flock / Herd Id: 17906-2/17906-3

Animals in Group:

Specimen Type	Breed	ID	Age	Sex	Qty
LIVER	TURTLE	Multiple IDs			2
KIDNEY	TURTLE	Multiple IDs			2

This Fee Estimate is based on the tests performed. If there are differences on your statement please contact the CAHFS Business Offices (1-800-553-6878) for more Information. For out of state clients call (530)-752-4613.

Current Charges:

Code	Test Name	Qty	Charge
8005	ANTICOAGULANT SCREEN	2	\$249.50
8120	PARAQUAT - TISSUE/OTHER	2	\$181.40
<u>Total</u>			<u>\$430.90</u>

THIS IS NOT A BILL
=====

PLEASE DO NOT PAY
=====

FROM THE MAIL ROOM OF THE HONOLULU POLICE DEPARTMENT

12/4/03

Date: Wed, 3 Dec 2003 11:46:16 -1000

034-31534

From: George H. Balazs <gbalazs@honlab.nmfs.hawaii.gov>

UPS DS DO PPCS M XS

To: Terry Spraker <tspraker@lamar.colostate.edu>

2) fx TRB

Cc: jswenson <jswenson@lamar.colostate.edu>

Subject: Tissues from two green turtles that recently died in captivity in BoraBora, French Polynesia

Terry and Jennifer- It's been a while since we've been in touch with one another! I hope all goes well with you folks, things are ok here, busy and hectic (in the bureaucracy) as usual.

Today I'm fedexing you two vials of tissues (with sample ID labels) of green turtles recently dead at a resort in Bora Bora. The turtles were said to be in good condition, eating well, before they both suddenly died. Other turtles held with these two continued to be fine. The turtles have all been here for some time, for several years is my understanding.

I'm trying now to get some pictures of the animals, and the crude necropsy that took place (and resulted in the collection of these tissues).

I hope you can discern something from the tissues to shed some light on this case. Best Regards and Aloha, George

* George H. Balazs, Leader *

* Marine Turtle Research Program *

* National Marine Fisheries Service *

* Pacific Islands Fisheries Science Center *

* Honolulu Laboratory *

* 2570 Dole Street *

* Honolulu, Hawaii 96822-2396 USA *

* Tel: (808) 983-5733 *

* Fax: (808) 983-2902 *

* gbalazs@honlab.nmfs.hawaii.edu *

slides 1-2 - turtle #1

3-6 - turtle #2

Colorado Veterinary Diagnostic Laboratory
College of Veterinary Medicine and Biomedical Sciences
Colorado State University, Fort Collins, CO 80523
Phone: 970-297-1281 Fax: 970-297-0320

DL#: 034-31534
Date: 12/4/03

Vet/Clinic: Dr. George Balazs/Marine Turtle Research Program
Owner: National Marine Fisheries Service
Animal ID: Date Specimen Taken:
Species: Breed: Age: Sex:

History: Tissues from two turtles that were found dead at a resort in Bora Bora were submitted for histopathology.

DIAGNOSIS:

Turtle 1

1. Mild tubular regeneration, subcapsular region, kidney, associated with parasitic ova.
2. Endocarditis, minimal, Multifocal, associated with trematode larvae, heart.
3. Spirochidiasis, heart.

Turtle 2

1. Fatty liver, severe, diffuse, cause undetermined.
2. Spirochidiasis, moderate, generalized.

REMARKS: The two lesions found in Turtle 1 were considered relatively mild. The lesions in the kidney and in the heart were most likely associated with a trematode infection, probably of vessels similar to what are found in other turtles. The algae found on the skin is an incidental finding and is of little importance. Turtle 2 did have a moderate Spirochidie infection but it is not unusual to see this many eggs in these turtles. The significant finding would have been if this animal had severe thrombosis of the aorta or some of the major vessels of the brain. The unusual finding in Turtle 2 was the severe degree of fatty accumulation in the liver. The cause of this was not determined. Occasionally this will be observed in young animals that are on a high fat diet, but the age of this turtle was not determined.

HISTOPATHOLOGY: Turtle 1/Slides 1 and 2.

Slide 1/Skin - Two sections of skin are examined. The epidermis and dermis are within normal limits. There are numerous fungal hyphae on the surface of the epidermis but these are saprophytic organisms and are causing no damage.

Skeletal Muscle - No significant lesions.

DL# 034-31534

Page 2

Slide 2/Kidneys - The glomeruli and tubules are within normal limits. There is an extensive amount of hemorrhage within the interstitial tissues and within the subcapsular regions. There are a few areas of the adrenal cortex just underneath the capsule that appear to have tubules and glomeruli that are developing. This suggests that this may be a relatively young turtle. In several areas, parasitic ova can be found in these small areas of regeneration of tubules. Therefore, this lesion may be associated only with parasites.

Heart - This section of heart does contain several granulomatous foci located within the endocardium. Within these granulomatous foci occasionally trematode eggs can be found. The remaining myocardium is within normal limits.

Turtle 2/Slides 3 through 6.

Slide 3/Liver - Hepatic cells are filled with lipid and there is one cross-section of a trematode in one of the hepatic vessels (Spirochidiasis). There are also numerous trematode eggs present throughout the liver. Trematode eggs are present both within the parenchyma and within granulomas. The overall abundance of parasite eggs is considered extremely high.

Collagen - This section of collagen is within normal limits.

Slide 4/Lungs - The large alveolar spaces are within normal limits. However, there are a moderate number of granulomas within the lung associated with trematode eggs. There is no evidence of pneumonia present in this section. Some of the eggs are surrounded by granulomas while other ones are not, this suggests that this animal does have a fairly severe ongoing infection with these parasites.

Slide 5/Heart - A few parasite eggs with mild granulomatous reactions are present within the endocardium of the heart.

Skeletal Muscle - No significant lesions.

Slide 6/Skin - This section of skin does contain a normal epidermis and dermis. A moderate population of algae is present on the surface of the skin. This is a relatively common finding and considered of little importance.


Terry R. Spraker, DVM/PhD DACVP

Faxed: 12/15/03 ea
Typed: 12/15/03 ea

Copy
Colorado Veterinary Diagnostic Laboratory
College of Veterinary Medicine and Biomedical Sciences
Colorado State University, Fort Collins, CO 80523
Phone: 970-297-1281 Fax: 970-297-0320

DL#: 045-64253
Date: 4/22/05

Vet/Clinic: George Balazs/National Marine Fisheries Service
Owner: Marine Turtle Research Program
Animal ID: #76 on bag, White dot on 5th central scute, second central scute has hole less than 1 cm (not all the way through scute), abnormal central scute count (+1)
Date Specimen Taken: NA
Species: Sea Turtle (*Chelonia mydas*) **Breed:** NA **Age:** **Sex:**

History: This turtle was one of several that was being raised at the Le Meridien Hotel in Bora Bora, Tahiti and is part of a mortality in these captive-reared turtles. This turtle has been frozen for some unspecified length of time. The exact cause of death of the turtle was not determined. The straight carapace length is 38.2 cm/width 32.7 cm. Curved carapace length 41 cm, width 38 cm. Plastron length is 31.2 cm. Weight 16.0 kg. Notch length is 37.9 cm. Head width is 6.3 cm, right front flipper width 6.8 cm, tail length T = 5.0, C = 3.5.

DIAGNOSIS: Parasitic granulomas with thrombosis, severe, brain, heart, liver, spleen, lung, stomach, small intestines, large intestines, kidney, thyroid gland.

REMARKS: This animal was in fair body condition and had a small amount of green vegetative material within the digestive system. However, on histopathology, nearly all of the organs had extremely severe infection with trematode eggs of the genera Spirochidae. This was associated with numerous areas of thrombosis of vessels. Many of these vessels were extremely large arteries, which would cause great compromise to the overall general circulation of this turtle. The white sandy material in the esophagus was most likely bits and pieces of shells on the surface of the exhibit. The cause of the hemorrhage in the musculature of the scapular area was not determined but may have been associated with the severe vasculitis throughout this animal.

GROSS NECROPSY: This turtle is in fair body condition. There are numerous black spots within the serosa of the small and large intestines. The large vessels exiting the heart show evidence of thrombosis. There is one large mass associated with these vessels that appears to be an extremely large thrombus within the aorta. The paired aortae of the thoracic region appear to be thrombosed. There is extensive hemorrhage in the musculature of the right scapula and humerus. The stomach is empty. There is a small amount of white bits and pieces of shell in the esophagus. Heart, lung, brain, kidney, skeletal muscle, and fat are all within normal limits.

HISTOPATHOLOGY: Slide 1/Brain - The brain does contain severe fractionation due to freezing, however, multiple vessels within the brain are thrombosed and contain parasitic eggs compatible in size and shape with the eggs of Spirochidae. The vessels affected by these eggs are both within the neural parenchyma and within the meninges. Thrombosed vessels with eggs are also present within the choroid plexus. Evidence of infarction is not found in these sections of brain, however, they have undergone autolysis and freezing artifact, which would make some of the more subtle lesions difficult to discern.

Slide 2/Heart - There are numerous trematode eggs within the trabecular spaces of the heart. They take various forms and shapes but they are all compatible with Spirochidae. At least a percentage of the eggs still appear to be viable. There are a few granulomas associated with these eggs within the myocardium. There is also evidence of endocarditis characterized by infiltration of inflammatory cells within the endocardial surface of the cardiac trabeculae. There are an increased number of inflammatory cells, primarily lymphoid cells, within the intima of the five major vessels exiting the heart. Most of the eggs are closer to the base of the heart than at the apex of the heart.

Slide 3/Liver - There are numerous granulomas throughout the liver, all containing Spirochidae eggs. These granulomas contain a moderate infiltration of inflammatory cells, primarily lymphocytes with a few macrophages. The eggs are randomly distributed throughout the liver parenchyma within sinusoids.

Spleen - The spleen has undergone severe fractionation because of freezing. There are numerous parasitic granulomas within the spleen. These parasitic granulomas are all composed of eggs typical of Spirochidae. These granulomas contain a moderate number of lymphocytes and macrophages.

Lung - The lung parenchyma is relatively open but there are extremely high numbers of large granulomatous-like lesions filled with these Spirochidae eggs. These granulomas do contain similar cell types, i.e. lymphocytes, macrophages, but some of these granulomas are surrounded by a thin zone of fibroplasia. The vessels throughout the lungs show evidence of endarteritis.

Slide 5/Aorta - A large portion of the aorta is totally thrombosed. The edges of this thrombus is nearly totally lined by granulomas of parasitic eggs. The thrombus within this large artery is relatively recent and may only be a day or less old. Degenerated parasites can be found in this acute thrombus. Sections of smaller major arteries show extensive endarteritis. These are some of the arteries between the terminal aspects of the lungs. One vessel is nearly half closed due to endarteritis. Numerous eggs are found in the intima of several of these vessels.

Slide 6/Vessels Adjacent to the Trachea - All of these vessels show evidence of endarteritis. Several show moderate thrombosis. Some of the smaller arteries are totally thrombosed. All of these thrombosed vessels and endarteritis lesions are associated with the Spirochidae eggs.

Trachea - This section of trachea is within normal limits.

Slide 7/Intestines - All of these sections of intestines have undergone severe autolysis, however, there are numerous large granulomas within the wall of the stomach associated with these Spirochidae eggs. These granulomas are located in the submucosa and in the mucosa.

Duodenum - There are numerous granulomas within the serosal of this section of duodenum, all composed of the Spirochidae eggs. Eggs are present in the submucosa and lamina propria.

Pancreas - Multiple granulomas are present within the pancreas, filled with Spirochidae eggs. The vessels of the pancreas also show evidence of endarteritis.

Slide 8/Small Intestines - The numerous black foci observed on the gross exam are all characterized by large nests of Spirochidae eggs. There are a few lymphocytes and macrophages within these parasitic granulomas. Vessels of the mesentery show severe endarteritis associated with these parasites. There is even evidence of inflammation of the intima of veins, but the majority of the lesions appear to be associated with arteries. Many of the granulomas appear to be areas where eggs have been deposited. Eggs and granulomas are numerous within the lamina propria.

Slide 9/Large Intestines - These sections of large intestines are severely affected as seen in the small intestines.

Slide 10 - A section of skeletal muscle appears to be within normal limits.

Thyroid Gland - The thyroid gland also contains granulomas with parasitic eggs. The follicles appear to be active and within normal limits.

Slide 11/Kidney - There are numerous large granulomas with parasitic eggs throughout the kidney. Several of the vessels around the edges of the kidney are thrombosed. One of the major renal vessels is totally thrombosed in this section. A large ganglion near this vessel is within normal limits.

Terry R. Spraker, DVM/PhD DACVP

Faxed: 5/3/05 ea
Typed: 5/3/05 ea

Copy
Colorado Veterinary Diagnostic Laboratory
College of Veterinary Medicine and Biomedical Sciences
Colorado State University, Fort Collins, CO 80523
Phone: 970-297-1281 Fax: 970-297-0320

DL#: 045-64254

Date: 4/22/05

Vet/Clinic: Dr. George Balazs/National Marine Fisheries Service
Owner: Marine Turtle Research Program
Animal ID: "7 pt 41 g" Tag, White spot 4th left lateral scute, pink substance on ventral aspect of turtle probably algae
Date Specimen Taken: NA
Species: Sea Turtle (*Chelonia mydas*) **Breed:** NA **Age:** **Sex:**

History: This is one of the sea turtles that died at the Le Meridien Hotel in Bora Bora, Tahiti. This animal appeared to be in excellent body condition and is one of the animals that died during this unexpected mortality occurring in these animals. The time of death of the animal was not recorded and the animal has been frozen for an undetermined amount of time. The straight carapace length is 40.6 cm. Width is 34.5 cm. Curved carapace length is 43.5 cm, width is 39.5 cm. Plastron length is 32.6 cm. Weight is 21.2 kg. Notch length is 40.3 cm. Head length is 7.0 cm. Right front flipper width 7.3 cm. Tail length, T= 7.0, C = 4.0.

DIAGNOSIS:

1. Endarteritis with thrombosis, severe, vessels.
2. Granulomas, multifocal, severe, generalized, nearly all organs of the body contain them.

REMARKS: The most likely cause of death in this turtle is associated with high parasitism, endarteritis, with granulomas throughout. The biggest problem with this situation, I think, is the endarteritis and alteration and compromise of blood-flow, especially to the brain and probably some of the other internal organs.

GROSS NECROPSY: This animal does contain an abundance of adipose tissue. There is a moderate amount of vegetation within the stomach and small intestines. All of the organs are within normal limits.

HISTOPATHOLOGY: Slide 1/Brain - Multiple sections of brain are examined. There are a moderate number of vessels, both within the meninges and within the brain parenchyma that contain parasitic eggs compatible in size and shape with trematodes (Spirochidae). There is extensive freezing artifact present throughout the brain, however, no noticeable areas of infarction are present associated with these parasites. There is one extremely large cross-section of a fluke in one of the meningeal vessels. The size of this fluke could easily cause extensive acute hypoxia to the brain. There is a degree of endarteritis in some of these meningeal vessels.

Slide 2/Brain - Several sections of brain are present. Similar lesions with the parasitic eggs are also found. There is one parasite filling one of the arteries of the meninges. There are numerous eggs within the brain and meningeal vessels. Another parasite is found in the brainstem region, in what would be the basilar artery of mammals. This artery is totally blocked and this vessel would be a major blood supply to the entire brainstem, which could cause acute respiratory and cardiac failure if it was blocked. This finding is probably extremely important in this turtle.

Slide 3/Heart - This section of heart is taken at the level of the exit of the large arteries leaving the heart. This particular artery leaving the heart is characterized by multiple small papillary projections of endarteritis. The semilunar valve in this area appears to be within normal limits. There are multiple areas of parasitic eggs scattered within the trabecular patterns of the heart in this region. This animal too has an extremely high parasitic load.

Slide 4/Heart - This section of heart is taken in the mid region and does contain one of the large openings of the heart. There are a noticeable number of eggs scattered throughout this heart. There is a minimal amount of granulomatous inflammation around many of these eggs.

Slide 5 - This is a cross-section of the large arteries leaving the heart. There are five of them. Four of them have a mild degree of endarteritis. One of them has a severe degree of papillary projections and endarteritis. The inflammatory cells in these areas are mostly lymphocytes and a few plasma cells.

Slide 6 has one section of the ventral aspect of the heart but also there is a large vessel in this region that is totally thrombosed. There are at least 2 to 4 large adult parasites in this section of the vessel. Several of the arteries adjacent to this area show extensive endarteritis. These parasites are a trematode and compatible in size and shape with Spirochidae. Associated with these parasites are hundreds of eggs that have been deposited in the adjacent tissue that are causing extensive reaction. There are many different sized and shapes, both round and elongated eggs. These many shaped eggs are associated with a single type of trematode. These eggs are probably soft and as they move through the tissue can acquire different shapes.

Slide 7/Lungs - These sections of lungs are characterized by numerous vessels that have moderate to severe endarteritis and numerous small granulomas surrounding parasitic eggs within the lung. In nearly every high-powered field, eggs are present within alveolar walls. The overall amount of parasitic involvement in these lungs is considered quite high.

Slide 8/Arteries - There are multiple medium-sized arteries examined on this slide that are primarily taken from the thoracic area adjacent to the lungs. All of these arteries have degrees of papillary endarteritis, some quite severe.

Thymus - A section of thymus is present. This section has undergone mild lymphoid depletion.

Slide 9/Stomach - The mucosa of the stomach contains numerous granulomas with parasitic ova. There are several vessels in the serosa of the stomach that are partially occluded because of severe endarteritis. One section of artery does contain two cross-sections of a trematode. The overall parasitic infection of the stomach is considered to be quite high.

Slide 10/Duodenum - Several granulomas are present within this section of duodenum. Parasitic eggs are most prominent in the serosal areas but are also present within the lamina propria. The most likely reason for the eggs being in the lamina propria is migration. These eggs are probably laid in the more peripheral tissues and then they have the ability to migrate into the intestinal lumen and are probably passed out into the intestinal tract.

Pancreas - The pancreas has undergone severe autolysis but also contains a moderate number of granulomas with eggs.

Esophagus - This section of esophagus contains a few eggs but otherwise is within normal limits.

Slide 11/Mesentery - Multiple arteries are present in this section of what appears to be mesentery. These medium-sized arteries are nearly totally thrombosed and several of them contain eggs of trematodes within the intima and within the proliferative portions, causing arterial obstruction.

Pancreas - This section is autolytic. There are a few eggs throughout the pancreas.

Spleen - This spleen shows evidence of severe freezing artifact and autolysis. However, there are numerous eggs scattered throughout this spleen. Some of these eggs are in granulomas. Others are just spread randomly throughout, probably because of the blood-flow. Several of the arteries in the spleen show extensive endarteritis.

Slide 12/Thyroid Gland - The follicles are of relatively normal size.

Small Intestines - Two sections of small intestines are present. Both contain a few eggs. One contains a few more eggs within the lamina propria. However, these sections have undergone severe autolysis.

Adipose Tissue - No significant lesions.

Slide 13 - This section contains both small and large intestines. The large intestines are areas that had ballooned out due to gas formation. These are severely autolytic but do contain a moderate number of eggs. The sections of small intestines are slightly more preserved. There is no evidence of enteritis except for the presence of the granulomas within the lamina propria filled with parasitic eggs.

Slide 14/Kidney - This section of kidney is within normal limits except for a moderate number of eggs and granulomas scattered throughout the parenchyma.

Skeletal Muscle - Two sections are examined. There are a few eggs present but otherwise the skeletal muscle is within normal limits.

Slide 15/Thymus - The thymus has undergone mild lymphoid depletion.

Skeletal Muscle - This section of skeletal muscle is within normal limits. There is a medium-sized artery near the thymus. This artery has undergone moderate endarteritis.

Bladder - There is a mild lymphofollicular proliferation within the wall of the bladder.

Terry R. Spraker, DVM/PhD DACVP

Faxed: 5/3/05 ea

Typed: 5/3/05 ea

2005

DIAGNOSTIC CASE REPORT

U. S. GEOLOGICAL SURVEY-BIOLOGICAL RESOURCES DIVISION
 NATIONAL WILDLIFE HEALTH CENTER-HONOLULU FIELD STATION
 P. O. BOX 50167, 300 ALA MOANA BLVD., Rm. 8-132
 HONOLULU, HAWAII 96850
 808-792-9520, FAX 792-9596, thierry_work@usgs.gov

Case # 17965

Epizoo #

Submitter:

Mr. George Balazs
 NOAA-NMFS-SWFC
 2570 Dole Street
 Honolulu, HI 96822

Specimen description/identification:

9 green turtle carcasses

Date Submitted: (04/26/2005)
 (mm/dd/yy)

Date Collected: (See below)
 (mm/dd/yy)

Date Examined: (04/26/2005)
 (mm/dd/yy)

Location: Hotel Meridien Bora BoraCounty/Site: Tahiti

HISTORY: These turtles died over a 5 month period (Aug-Dec) in 2004. Nine turtles were shipped to Honolulu, HI where 7 underwent necropsy at the Honolulu Field Station. An addition 2 turtles were sent to Colorado State University Department of Pathology for examination. This report details findings from the 7 turtles necropsied at the HFS.

**SIGNIFICANT FINDINGS:**

Acc	Sex	Age	SCL	ID	Died	Body Condition	Diagnosis
1	M	I	38.2	Marine	25-Sep-04	Good	Unknown
2	F	I	49.5	Nemo	Sept 04	Fair	Unknown
3	F	I	57.2	Kahia	Nov 04	Good	Trauma
4	M	I	30.5	1st Central	Oct 04	Fair	Unknown
5	U	I	22.9	4rth Central	Dec 04	Emaciated	Vascular flukes and bacterial infection
6	M	I	21.8	#11	3-Dec-04	Emaciated	Vascular flukes
7	M	I	20.9	None	16-Aug-04	Emaciated	Vascular flukes and bacterial infection

COMMENTS: Animals 1, 5 and 6 had missing fragments of the trailing edge of the rear flippers suggesting that turtles were biting each other. This along with the fair to poor body condition and the trauma in one animal indicates that there are serious management issues for these captive turtles, starting with the fact that they are probably being housed too densely or are not being fed sufficiently. No lesions indicative of cause of death were seen in 3 turtles. The smallest turtles all died either directly from or had bacterial infections secondary to massive infection with vascular flukes. It is difficult to tell from necropsy whether heavy parasite loads preceded or were a sequela to emaciation.

NATIONAL WILDLIFE HEALTH CENTER
NECROPSY REPORT

Submitter's Name, Affiliation Address

Mr. George Balazs
NOAA-NMFS-SWFC
2570 Dole Street
Honolulu, HI 96822

Case: 17965
Accession: 001
Collected: 09/14/2004
Exam Date: 04/26/2005
Pathologist: T.M. Work
Prosector: T.M. Work

Species: Green turtle Specimen: Carcass
Bandtype: (N) Ref/Band No: () Euth: (N) Weight (Gm): (7727)
History Summary: This animal is one of seven received from Tahiti that showed lack of energy and no appetite. Most died several days after not eating. This animal identified as Marine showed no eye reflex and died on 9-25-04. Body measurement: SCL-38.2.

EXTERNAL/INTERNAL OBSERVATIONS - LABORATORY RESULTS

External: The hind flippers are bitten on the trailing edges. There is unidentified animal flesh in the oral cavity.

Internal: There adequate coelomic fat. The liver is firm, smooth, and homogenous purple-brown. The heart is firm, smooth, homogenous red-pink and otherwise unremarkable. The lungs are spongy and homogenous pink. The tracheal lumen is smooth and tan. The spleen is firm, smooth, and homogenous red-brown. The kidneys are firm, smooth, and homogenous brown. The brain is smooth, firm, and homogenous tan. The esophageal mucosa is smooth and homogenous tan. The stomach contains small amounts of *Turbinaria* algae. The small intestines are smooth and homogenous tan. No lesions are seen in the brain, pericardial sac, heart valves, tracheal lumen, gall bladder, gastrointestinal mucosa and serosa, gonads, adrenal and thyroid glands, pancreas and superficial and cut surface of liver, heart, kidney, spleen, and lungs.

Preliminary Diagnosis: Undetermined Exam Type: (GO)
Sex (M) Age (I)/() Body Cond. (G) Postmortem State (G) Giz. Lead ()/()
Samples saved:

1. Histo: Brain, salt gland (A); liver, spleen, skin, skeletal muscle (B); lung (C); kidney (D); heart (E); small intestines (F).
2. Frozen: kidney, liver, stomach content.

HISTOPATHOLOGY:

Brain: There are small numbers of trematode eggs associated with macrophages and giant cells.

Salt gland: There are small numbers of trematode eggs associated with macrophages and giant cells.

Spleen: The organ is moderately autolyzed, and there are moderate numbers of trematode eggs.

Liver: The organ is moderately autolyzed, and there are small numbers of trematode eggs.

Kidney: The organ is moderately autolyzed, and there are small numbers of trematode eggs.

Small intestines: There are scattered aggregate of trematode eggs within the serosa.

All other tissues: No remarkable lesions are seen.

Morphologic Diagnoses:

- 1) Moderate, focal, chronic, inflammation with trematode eggs, spleen, kidney, salt gland, kidney, liver, small intestines.

Comments: No gross or microscopic lesions indicative of cause of death were seen.

Final Diagnosis (in order of importance)

	topog.	morph.	etiolo.	funct.	disease	link
1. <u>Undetermined</u>	(T00010)	()	(E00040)	(FY3500)	()	()
2. _____	()	()	()	()	()	()
3. _____	()	()	()	()	()	()

Diagnostic findings may not be used for publication without the pathologist's knowledge and consent.

COD (01)

NATIONAL WILDLIFE HEALTH CENTER
NECROPSY REPORT

Submitter's Name, Affiliation Address

Mr. George Balazs
NOAA-NMFS-SWFC
2570 Dole Street
Honolulu, HI 96822

Case: 17965
Accession: 002
Collected: 03/00/2004
Exam Date: 04/26/2005
Pathologist: T.M. Work
Prosector: T.M. Work

Species: Green turtle Specimen: Carcass
Bandtype: (N) Ref/Band No: () Euth: (N) Weight (Gm): (16364)
History Summary: This animal is one of seven received from Tahiti that showed lack of energy and no appetite. Most died several days after not eating. This animal identified as Nemo was caught in fishing net and was brought to the center. It died in September 2004.
Body measurement: SCL-49.5 cm.

EXTERNAL/INTERNAL OBSERVATIONS - LABORATORY RESULTS

External: There are moderate amounts of algae on the plastron and a healing laceration in the right inguinal area.

Internal: There are moderate amounts of coelomic fat. The liver is firm, smooth, and homogenous purple-brown. The heart is firm, smooth, homogenous red-pink and otherwise unremarkable. The lungs are spongy and homogenous pink. The tracheal lumen is smooth and tan. The spleen is firm, smooth, and homogenous red-brown. The kidneys are firm, smooth, and homogenous brown. The brain is smooth, firm, and homogenous tan-pink. The esophageal mucosa is smooth and homogenous tan. The stomach contains small amounts of *Turbinaria* algae and leaves. The intestines are smooth and homogenous tan. No lesions are seen in the brain, pericardial sac, heart valves, tracheal lumen, gall bladder, gastrointestinal mucosa and serosa, gonads, adrenal and thyroid glands, pancreas and superficial and cut surface of liver, heart, kidney, spleen, and lungs.

Preliminary Diagnosis: Undetermined Exam Type: (GO)
Sex (F) Age (I)/() Body Cond. (F) Postmortem State (G) Giz. Lead ()/()
Samples saved:

1. Histo: Brain, salt gland (A); liver, skin, spleen (B); lung (C); kidney (D); heart (E); small and large intestines (F).
2. Frozen: kidney, liver, stomach content.

HISTOPATHOLOGY:

Brain: There are small numbers of trematode eggs.

Salt gland: There are small numbers of trematode eggs.

Liver: The organ is moderately autolyzed, and there are small numbers of trematode eggs.

Spleen: The organ is moderately autolyzed, and there are moderate numbers of trematode eggs.

Skin: There is focal erosion of the skin characterized by replacement of epidermis with masses of eosinophilic debris.

Lung: Small numbers of trematode eggs are seen within the muscularis.

Kidney: The organ is moderately autolyzed, and there are small numbers of trematode eggs.

All other tissues: No remarkable lesions are seen.

Morphologic Diagnoses:

- 1) Moderate, focal, chronic, inflammation with trematode eggs, spleen, kidney, salt gland, kidney, lung, liver, small intestines.
- 2) Mild, focal, chronic, necrosis and inflammation, skin.

Comments: No gross or microscopic lesions indicative of cause of death were seen.

Final Diagnosis (in order of importance)

	topog.	morph.	etiol.	funct.	disease	link
1. <u>Undetermined</u>	(T00010)	()	(E00040)	(FY3500)	()	()
2. _____	()	()	()	()	()	()
3. _____	()	()	()	()	()	()

Diagnostic findings may not be used for publication without the pathologist's knowledge and consent.

COD (01)

NATIONAL WILDLIFE HEALTH CENTER
NECROPSY REPORT

Submitter's Name, Affiliation Address

Mr. George Balazs
NOAA-NMFS-SWFC
2570 Dole Street
Honolulu, HI 96822

Case: 17965
Accession: 003
Collected: 04/01/2002
Exam Date: 04/26/2005
Pathologist: T.M. Work
Prosector: T.M. Work

Species: Green turtle Specimen: Carcass
Bandtype: (N) Ref/Band No: () Euth: (N) Weight (Gm): (24864)
History Summary: This animal is one of seven received from Tahiti that showed lack of energy and no appetite. Most died several days after not eating. This animal identified as Kahaia was born at the Meridian Hotel and stayed at the center until death in November 2004. Body measurement: SCL-57.2 cm. Other identification: Tag on LFF- 818E.

EXTERNAL/INTERNAL OBSERVATIONS - LABORATORY RESULTS

External: The right front flipper is nearly severed with a clean cut.

Internal: There is a large amount of body fat. The liver is firm, smooth, and homogenous purple-brown. The heart is firm, smooth, homogenous red-pink and otherwise unremarkable. The lungs are spongy and homogenous pink. The tracheal lumen is smooth and tan. The spleen is firm, smooth, and homogenous red-brown. The kidneys are firm, smooth, and homogenous brown. The brain is smooth, firm, and homogenous tan-pink. The esophageal mucosa is smooth and homogenous tan. The stomach is empty. The small intestines are smooth and homogenous tan and mostly empty. No lesions are seen in the brain, pericardial sac, heart valves, tracheal lumen, gall bladder, gastrointestinal mucosa and serosa, gonads, adrenal and thyroid glands, pancreas and superficial and cut surface of liver, heart, kidney, spleen, and lungs.

Preliminary Diagnosis: Trauma Exam Type: (GO)
Sex (F) Age (I)/() Body Cond. (E) Postmortem State (G) Giz. Lead ()/()

Samples saved:

1. Histo: Brain, salt gland (A); spleen, liver (B); lung (C); kidney (D); heart (E); small intestines, thymus (F).
2. Frozen: kidney, liver.

HISTOPATHOLOGY:

Brain: There are moderate numbers of trematode eggs.

Salt gland: There are small numbers of trematode eggs.

Spleen: The organ is moderately autolyzed, and there are moderate numbers of trematode eggs.

Lung: There are small numbers of trematode eggs within muscularis.

Kidney: The organ is moderately autolyzed, and there are small numbers of trematode eggs.

Small intestines: There are small numbers of trematode eggs within the lamina propria.

Morphologic Diagnoses:

- 1) Moderate, focal, chronic, inflammation with trematode eggs, spleen, kidney, salt gland, kidney, liver, small intestines.

Comments: The most significant finding was the traumatic amputation of the flipper the cause of which was undetermined. Possibilities include attack by shark or humans. The large amounts of body fat suggest this animal died rapidly.

Final Diagnosis (in order of importance)

	topog.	morph.	etiolo.	funct.	disease	link
1. <u>Trauma</u>	(T10050)	()	(E90020)	()	()	()
2. _____	()	()	()	()	()	()
3. _____	()	()	()	()	()	()

Diagnostic findings may not be used for publication without the pathologist's knowledge and consent.

NATIONAL WILDLIFE HEALTH CENTER
NECROPSY REPORT

Submitter's Name, Affiliation Address

Mr. George Balazs
NOAA-NMFS-SWFC
2570 Dole Street
Honolulu, HI 96822

Case: 17965
Accession: 004
Collected: 11/00/2003
Exam Date: 04/26/2005
Pathologist: T.M. Work
Prosector: T.M. Work

Species: Green turtle Specimen: Carcass
Bandtype: (N) Ref/Band No: () Euth: (N) Weight (Gm): (3500)
History Summary: This animal is one of seven received from Tahiti that showed lack of energy and no appetite. Most died several days after not eating. This animal was brought to the center in November 2003 and died in October 2004. Body measurement: SCL-30.5 cm.
Identification: white dot on 1st central scute (IPTIC).

EXTERNAL/INTERNAL OBSERVATIONS - LABORATORY RESULTS

External: No remarkable lesions are seen.

Internal: There are small amounts of coelomic fat. The liver is firm, smooth, and homogenous purple-brown. The heart is firm, smooth, homogenous red-pink and otherwise unremarkable. The lungs are spongy and homogenous pink. The tracheal lumen is smooth and tan. The spleen is firm, smooth, and homogenous red-brown. The kidneys are firm, smooth, and homogenous brown. The brain is smooth, firm, and homogenous tan-pink. The esophageal mucosa is smooth and homogenous tan. The intestines are tan and are empty. No lesions are seen in the brain, musculoskeletal system, pericardial sac, heart valves, tracheal lumen, gall bladder, gastrointestinal mucosa and serosa, gonads, adrenal and thyroid glands, pancreas and superficial and cut surface of liver, heart, kidney, spleen, and lungs.

Preliminary Diagnosis: Undetermined Exam Type: (GO)
Sex (M) Age (I)/() Body Cond. (F) Postmortem State (G) Giz. Lead ()/()
Samples saved:

1. Histo: Brain, salt gland (A); liver, small intestines (B); spleen, lung (C); kidney (D); heart (E).
2. Frozen: kidney, liver, stomach content.

HISTOPATHOLOGY:

Small intestines: There are small numbers of trematode eggs within the lamina propria.

Lung: There are large numbers of trematode eggs within the muscularis.

Kidney: There are small numbers of trematode eggs within the lamina propria.

Heart: A vascular trematode is seen within the lumen.

All other tissues: No remarkable lesions are seen.

Morphologic Diagnoses:

- 1) Moderate, focal, chronic, inflammation with trematode eggs, lung, kidney, heart, small intestines.

Comments: No gross or microscopic lesions indicative of cause of death were seen.

Final Diagnosis (in order of importance)

	topog.	morph.	etiol.	funct.	disease	link
1. <u>Undetermined</u>	(T00010)	()	(E00040)	(FY3500)	()	()
2. _____	()	()	()	()	()	()
3. _____	()	()	()	()	()	()

Diagnostic findings may not be used for publication without the pathologist's knowledge and consent.

COD (01)

NATIONAL WILDLIFE HEALTH CENTER
NECROPSY REPORT

Submitter's Name, Affiliation Address

Mr. George Balazs
NOAA-NMFS-SWFC
2570 Dole Street
Honolulu, HI 96822

Case: 17965
Accession: 005
Collected: 10/27/2004
Exam Date: 04/26/2005
Pathologist: T.M. Work
Prosector: T.M. Work

Species: Green turtle Specimen: Carcass
Bandtype: (N) Ref/Band No: () Euth: (N) Weight (Gm): (1545)
History Summary: This animal is one of seven received from Tahiti that showed lack of energy and no appetite. Most died several days after not eating. This animal showed no eye reflex and died in December 2004. Body measurement: SCL-22.9 cm. Identification: white dot on 4th central scute.

EXTERNAL/INTERNAL OBSERVATIONS - LABORATORY RESULTS

External: The hind flippers are bitten on trailing edges. The animal is severely emaciated.

Internal: There is marked atrophy of coelomic fat. The liver is firm, smooth, homogenous purple-brown, and appears enlarged. The heart is firm, smooth, homogenous red-pink and otherwise unremarkable. The lungs are pink and contain scattered firm nodules granulomas. The tracheal lumen is smooth and tan. The spleen is firm, smooth, and homogenous red-brown. The kidneys are firm, smooth, and homogenous brown. The brain is smooth, firm, and homogenous tan-pink. The esophageal mucosa is smooth and homogenous tan. The stomach contains a large amount of unidentified meat. The intestines are tan and the serosa contains large numbers of egg packets. The intestines are mostly empty. No lesions are seen in the brain, pericardial sac, heart valves, tracheal lumen, gall bladder, gastrointestinal mucosa, adrenal and thyroid glands, pancreas and superficial and cut surface of heart, kidney, and spleen.

Preliminary Diagnosis: Pneumonia Exam Type: (GO)
Sex (U) Age (I)/() Body Cond. (M) Postmortem State (G) Giz. Lead ()/()
Samples saved:

1. Histo: Lung (A-B); heart, liver (C); kidney, brain, spleen (D).
2. Frozen: kidney, liver, stomach content.

HISTOPATHOLOGY:

Lung: There are massive numbers of trematode eggs within the muscularis some of which efface pulmonary architecture and are associated with eosinophilic debris. Within ediculae are accumulations of mononuclear cells. Several vessels are occluded by eosinophilic debris, masses of trematode eggs, and trematodes.

Heart: Large numbers of trematodes are seen within the lumen.

Kidney: Large numbers of trematode eggs are seen among proximal tubules.

Spleen: Small numbers of trematode eggs are seen.

Small intestines: There are large numbers of trematode eggs within the serosa.

All other tissues: No remarkable lesions are seen.

Morphologic Diagnoses:

- 1) Severe, diffuse, necrosis and inflammation associated with trematode eggs, lung.
- 2) Severe, diffuse, trematodiasis, heart, kidney, spleen, small intestines

Comments: Gross and microscopic lesions indicated this animal died from emaciation complicated by massive infection with vascular trematodes.

Final Diagnosis (in order of importance)

	topog.	morph.	etiolo.	funct.	disease	link
1. <u>Emaciation</u>	(T10010)	(M70700)	()	()	()	()
2. <u>Fluke infection</u>	(T41000)	(M40000)	()	(F01310)	()	()
3. <u>Bacteremia</u>	()	()	()	(F01130)	()	()

Diagnostic findings may not be used for publication without the pathologist's knowledge and consent.

COD (04)

NATIONAL WILDLIFE HEALTH CENTER
NECROPSY REPORT

Submitter's Name, Affiliation Address

Mr. George Balazs
NOAA-NMFS-SWFC
2570 Dole Street
Honolulu, HI 96822

Case: 17965
Accession: 006
Collected: 05/23/2004
Exam Date: 04/26/2005
Pathologist: T.M. Work
Prosector: T.M. Work

Species: Green turtle Specimen: Carcass
Bandtype: (N) Ref/Band No: () Euth: (N) Weight (Gm): (1409)
History Summary: This animal is one of seven received from Tahiti that showed lack of energy and no appetite. Most died several days after not eating. This animal showed decreased energy and low appetite starting mid October and died on 12-3-04. Body measurement: SCL-21.8 cm. Identification: 11 on first lateral left scute.

EXTERNAL/INTERNAL OBSERVATIONS - LABORATORY RESULTS

External: The hind flippers have multiple lacerations on the caudal edge indicating they were bitten. The animal is severely emaciated.

Internal: There is marked atrophy of coelomic fat. The liver contains seven 1-3mm granulomas. The heart is firm, smooth, homogenous red-pink and otherwise unremarkable. The right lung contains one 5 mm caseous granuloma. The tracheal lumen is smooth and tan. The spleen is firm, smooth, and homogenous red-brown. The kidneys are firm, smooth, and homogenous brown. The brain is smooth, firm, and homogenous tan-pink. The esophageal mucosa is smooth and homogenous tan. The mid-small intestinal serosa contains multiple, firm, 1-3mm, beige nodules, and the intestines are empty. No lesions are seen in the brain, pericardial sac, heart valves, tracheal lumen, gall bladder, gastrointestinal mucosa, gonads, adrenal and thyroid glands, pancreas and superficial and cut surface of heart, kidney, and spleen.

Preliminary Diagnosis: Pneumonia and hepatitis Exam Type: (GO)
Sex (M) Age (I)/() Body Cond. (M) Postmortem State (G) Giz. Lead ()/()
Samples saved:

1. Histo: Lung (A); lung, liver (B); spleen, liver (C); heart, kidney (D); small intestines (E); brain (F).
2. Frozen: liver, intestine.

HISTOPATHOLOGY:

Lung: There are massive numbers of trematode eggs within the muscularis some of which efface pulmonary architecture and are associated with eosinophilic debris. Within ediculae are accumulations of mononuclear cells. There is a large nidus of eosinophilic debris mixed with trematode eggs and surrounded by a connective tissue capsule.

Liver: There are scattered variably sized nidi of eosinophilic debris mixed with clumps of bacteria surrounded by giant cells and macrophages.

Small intestines: Within the submucosa are large numbers of trematode eggs. Large nidi of eosinophilic debris surrounded by giant cells and containing occasional trematode eggs are seen within the serosa.

Brain: Small numbers of trematode eggs are seen.

All other tissues: No remarkable lesions are seen.

Morphologic Diagnoses:

- 1) Severity, diffuse, chronic, inflammation and necrosis with trematode eggs, lung, small intestines.
- 2) Severe, focal, chronic, inflammation and necrosis with bacteria, liver.

Histopathology (cont.)

Comments: Gross and microscopic lesions indicated this animal died from emaciation complicated by massive infection with vascular trematodes.

Final Diagnosis (in order of importance)

	topog.	morph.	etiol.	funct.	disease	link
1. <u>Emaciation</u>	(T10010)	(M70700)	()	()	()	()
2. <u>Fluke infection</u>	(T41000)	(M40000)	()	(F01310)	()	()
3. _____	()	()	()	()	()	()

Diagnostic findings may not be used for publication without the pathologist's knowledge and consent.

NATIONAL WILDLIFE HEALTH CENTER
NECROPSY REPORT

Submitter's Name, Affiliation Address

Mr. George Balazs
NOAA-NMFS-SWFC
2570 Dole Street
Honolulu, HI 96822

Case: 17965
Accession: 007
Collected: 05/06/2004
Exam Date: 04/26/2005
Pathologist: T.M. Work
Prosector: T.M. Work

Species: Green turtle Specimen: Carcass
Bandtype: (N) Ref/Band No: () Euth: (N) Weight (Gm): (1273)
History Summary: This animal is one of seven received from Tahiti that showed lack of energy and no appetite. Most died several days after not eating. This animal identified as None died on 8-16-04. Body measurement: SCL-20.9 cm. Identification: 13.

EXTERNAL/INTERNAL OBSERVATIONS - LABORATORY RESULTS

External: The animal is severely emaciated.

Internal: There is marked atrophy of coelomic fat. The left liver lobe contains multiple 1-2mm yellow-white nodules. The heart is firm, smooth, homogenous red-pink and otherwise unremarkable. The left lung contains multiple firm 1-3 mm yellow-white nodules. The tracheal lumen is smooth and tan. The spleen contains two 2mm granulomas. The kidneys are firm, smooth, and homogenous brown. The brain is smooth, firm, and homogenous tan-pink. The esophageal mucosa is smooth and homogenous tan. The mid intestinal serosa contain numerous small (1-2 mm) dark nodular aggregates. The intestines are empty. No lesions are seen in the brain, pericardial sac, heart valves, tracheal lumen, gall bladder, gastrointestinal mucosa, gonads, adrenal and thyroid glands, pancreas and superficial and cut surface of heart and kidney.

Preliminary Diagnosis: Hepatitis and pneumonia Exam Type: (GO)
Sex (M) Age (I)/() Body Cond. (M) Postmortem State (G) Giz. Lead ()/()
Samples saved:

1. Histo: Kidney, brain (A); spleen, heart (B); liver (C); lung (D); small intestines (E).
2. Frozen: kidney, liver.

HISTOPATHOLOGY:

Spleen: There are moderate numbers of trematode eggs. Near the edge is a large nidus of eosinophilic debris mixed with bacteria and surrounded by macrophages and giant cells.

Liver: There are scattered variably sized nidi of eosinophilic debris mixed with clumps of bacteria surrounded by giant cells and macrophages.

Lung: There are massive numbers of trematode eggs within the muscularis some of which efface pulmonary architecture and are associated with eosinophilic debris. Within ediculae are accumulations of mononuclear cells. There is a large nidus of eosinophilic debris mixed with trematode eggs and surrounded by a connective tissue capsule.

Small intestines: Within the submucosa are large numbers of trematode eggs. Large nidi of eosinophilic debris surrounded by giant cells and containing occasional trematode eggs are seen within the serosa.

All other tissues: No remarkable lesions are seen.

Morphologic Diagnoses:

- 1) Severity, diffuse, chronic, inflammation and necrosis with trematode eggs, lung, small intestines.
- 2) Severe, focal, chronic, inflammation and necrosis with bacteria, liver.

Comments: Gross and microscopic lesions indicated this animal died from emaciation complicated by massive infection with vascular trematodes.

Final Diagnosis (in order of importance)

	topog.	morph.	etiolo.	funct.	disease	link
1. <u>Emaciation</u>	(T10010)	(M70700)	()	()	()	()
2. <u>Fluke infection</u>	(T41000)	(M40000)	()	(F01310)	()	()
3. <u>Bacteremia</u>	()	()	()	(F01130)	()	()

Diagnostic findings may not be used for publication without the pathologist's knowledge and consent.

COD (04)

Tahiti

5/05 TW

Accession	ID	SCL	Date collected	Date Dead	Gross
1	Maume	38.2	14-Sep-04	25-Sep-04	Good body condition, unidentified meat in mouth, turbinaria in stomach, no internal lesions seen
2	Nemo	49.2	Mar-04	Sept 2004	Fair body condition, turbinaria and leaves in stomach, algae on plastron, no internal lesions seen.
3	Kahaia	57.2	Apr-02	Oct-04	Good body condition, Right front flipper recently severed, no internal lesions seen
4	IPTIC	30.5	Nov-03	Oct-04	Fair body condition, no internal lesions seen
5	White dot Central	22.9	27-Oct-04	Dec-04	Emaciated
6		21.8	23-May-04	3-Dec-04	Emaciated, Inflammation of the liver and lung, granulomas in intestines
7		20.9	6-May-04	16-Aug-04	Emaciated, Inflammation of the liver, spleen, and lung, parasite egg packets in intestines

ORIG

2004

DIAGNOSTIC CASE REPORT

U. S. GEOLOGICAL SURVEY-BIOLOGICAL RESOURCES DIVISION
NATIONAL WILDLIFE HEALTH CENTER-HONOLULU FIELD STATION
P. O. BOX 50167, 300 ALA MOANA BLVD., Rm. 8-132
HONOLULU, HAWAII 96850
808-792-9520, FAX 792-9596, thierry.work@usgs.gov

Case # 17906

Epizoo #

Submitter:

Mr. George Balazs
NOAA-NMFS-SWFC
2570 Dole Street
Honolulu, HI 96822-2396

Specimen description/identification:

Carcasses and fixed tissues from 3 and 4 green turtles, respectively.

Date Submitted: (12/03/2004)

(mm/dd/yy)

Date Collected: (See below)

(mm/dd/yy)

Date Examined: (12/03/2004)

(mm/dd/yy)

Location: Le Meridien Hotel, Bora Bora

County/Site: Tahiti

HISTORY: These animals were raised at Le Meridien Hotel in Bora Bora and were part of an unusual mortality in the hotel lagoon. Date of collection for all turtles unknown.

SIGNIFICANT FINDINGS: A variety of gross and microscopic findings were seen none of which, except for one case, could explain the cause of death. Tissues analyzed for anticoagulants and paraquat (turtles 1 and 2) were negative for both toxicants.

Accession	TurtleID	SCL	AGE	SEX	DIAGNOSIS	SUMMARY OF FINDINGS
1	None	25.5	I	F	Fluke infection	Massive trematode eggs in tissues.
2	2 dots	37.3	I	F	Undetermined	Collapsed lungs
3	3 dots	42.1	I	F	Undetermined	Mild trematode eggs in tissues
4	Shark	NA	NA	NA	Undetermined	Autolyzed tissues
5	Bora	NA	NA	NA	Undetermined	Vacuolar degeneration of liver.
6	Tortue 11	NA	NA	NA	Undetermined	Severe brain inflammation.
7	Naomi	NA	NA	NA	Undetermined	Mild trematode eggs in tissues

COMMENTS: No unifying cause of death could be seen for all these turtles. In many cases, tissues were too decomposed or autolyzed to make a good assessment. In the future, it would be helpful, if we're to sort out this mortality, to have the following information for animals submitted: Date and location of collection, size, weight, sex, necropsy findings (if done), and preservation of tissues in 10% buffered formalin. If possible, careful necropsies with collection of fresh tissues would be helpful. A turtle necropsy report is available online at www.nwhc.usgs.gov/hfs/products.htm.

MANAGEMENT: None given unknown etiologies of death for most turtles.

_____ Preliminary Report (/ /) _____ X _____ Final Report (03/07/2005)
date date

Necropsy report is: X enclosed _____ available upon request.

_____ : Copies of this report sent to:

If you have questions regarding this case, contact Thierry M. Work MS, DVM, MPVM at 808-792-9520. Include above Case Number. Diagnostic findings may not be used for publication without the pathologist's knowledge and consent.

NATIONAL WILDLIFE HEALTH CENTER
NECROPSY REPORT

Submitter's Name, Affiliation Address

Mr. George Balazs
NOAA-NMFS-SWFC
2570 Dole Street
Honolulu, HI 96822

Case: 17906
Accession: 001
Collected: 00/00/2004
Exam Date: 12/03/2004
Pathologist: T.M. Work
Prosector: T.M. Work

Species: Green turtle Specimen: Carcass
Bandtype: (N) Ref/Band No: () Euth: (N) Weight (Gm): (1800)
History Summary: This animal was found dead in the lagoon of Le Meridien-Bora Bora in Tahiti and shipped to Honolulu for necropsy. Body measurements (cm): SCL-25.5, SCW-22.7, RFF width-4.8, plastron length-21.1, notch length-25.3, head width-4.4.

EXTERNAL/INTERNAL OBSERVATIONS - LABORATORY RESULTS

External: No remarkable lesions are seen.

Internal: The liver is firm, smooth, and homogenous purple-brown. The heart is firm, smooth, homogenous red-pink and otherwise unremarkable. The lungs are spongy and homogenous pink. The spleen is firm, smooth, and homogenous red-brown. The kidneys are firm, smooth, and homogenous brown. The brain is smooth, firm, and homogenous tan-pink. The esophageal mucosa is smooth and homogenous tan. The intestines are tan and the serosa contains numerous black nodules. No lesions are seen in the brain, musculoskeletal system, pericardial sac, heart valves, tracheal lumen, gall bladder, gastrointestinal mucosa and serosa, gonads, adrenal and thyroid glands, pancreas and superficial and cut surface of liver, heart, kidney, spleen, and lungs.

Preliminary Diagnosis: Undetermined Exam Type: (GO)
Sex (F) Age (I) / () Body Cond. (G) Postmortem State (G) Giz. Lead () / ()
Samples saved:

1. Histo: Brain (A); kidney, spleen, pancreas (B); lung, liver (C); heart (D); small and large intestines, pancreas (E); thyroid, mesentery (F).

HISTOPATHOLOGY:

Lung: There are massive numbers of trematode within smooth muscle walls. Two types of eggs are seen, round eggs and eggs with bipolar spines that appear to elicit a more severe inflammatory response.

Thyroid: There are moderate numbers of trematode eggs. Two types of eggs are seen, round eggs and eggs with bipolar spines that appear to elicit a more severe inflammatory response. Round eggs appear more numerous.

Liver: There are moderate numbers of trematode eggs. Two types of eggs are seen, round eggs and eggs with bipolar spines that appear to elicit a more severe inflammatory response. More round eggs are seen.

Heart: There are moderate numbers of trematode eggs. Two types of eggs are seen, round eggs and eggs with bipolar spines that appear to elicit a more severe inflammatory response. More round eggs are seen.

Brain: There are small numbers of trematode eggs associated with macrophages and giant cells. Two types of eggs are seen, round eggs and eggs with bipolar spines that appear to elicit a more severe inflammatory response.

Spleen: There are numerous trematode eggs. Two types of eggs are seen, round eggs and eggs with bipolar spines that appear to elicit a more severe inflammatory response.

Kidney: There are moderate numbers of trematode eggs among proximal tubules. Two types of eggs are seen, round eggs and eggs with bipolar spines that appear to elicit a more severe inflammatory response.

Pancreas: There are moderate numbers of trematode eggs among proximal tubules. Two types of eggs are seen, round eggs and eggs with bipolar spines that appear to elicit a more severe inflammatory response.

Histopathology (Cont.)

Pancreas: There are large numbers of trematode eggs. Two types of eggs are seen, round eggs and eggs with bipolar spines that appear to elicit a more severe inflammatory response.

Small Intestine: There are large numbers of trematode eggs within the submucosa and serosa. Two types of eggs are seen, round eggs and eggs with bipolar spines that appear to elicit a more severe inflammatory response. More round eggs are seen. Adult trematodes are present within mesenteric arteries.

Morphologic Diagnoses:

1) Moderate to severe, diffuse, chronic, inflammation with trematode eggs, lungs, liver, spleen, kidney, thyroid, intestines, brain, pancreas.

Comments: This turtle had massive numbers of trematode eggs in multiple organs, particularly the lungs. Although no necrosis was seen associated with these eggs, their sheer numbers makes it difficult to conceive that they did not have something to do with the animal's death.

Final Diagnosis (in order of importance)

	topog.	morph.	etiol.	funct.	disease	link
1. <u>Fluke infection</u>	(T41000)	(M40000)	()	(F01310)	()	()
2. _____	()	()	()	()	()	()
3. _____	()	()	()	()	()	()

Diagnostic findings may not be used for publication without the pathologist's knowledge and consent.

NATIONAL WILDLIFE HEALTH CENTER
NECROPSY REPORT

Submitter's Name, Affiliation Address

Mr. George Balazs
NOAA-NMFS-SWFC
2570 Dole Street
Honolulu, HI 96822

Case: 17906
Accession: 002
Collected: 00/00/2004
Exam Date: 12/03/2004
Pathologist: T.M. Work
Prosector: T.M. Work

Species: Green turtle Specimen: Carcass
Bandtype: (N) Ref/Band No: (2 dots) Euth: (N) Weight (Gm): (11364)
History Summary: This animal was found dead in the lagoon of Le Meridien-Bora Bora in Tahiti and shipped to Honolulu for necropsy. Body measurements (cm): SCL-42.1, SCW-34.3, plastron length-35.0, notch length-41.8, CCL-45.0, CCW-42.5.

EXTERNAL/INTERNAL OBSERVATIONS - LABORATORY RESULTS

External: There are 2 mototool dots on the 5th central scute. The carcass is massively swollen and the cloaca is prolapsed.

Internal: There is edema and hemorrhage of the head and pelvic musculature. There is diffuse hemorrhage in the submandibular musculature. The coelomic cavity is filled with air. The liver is firm, smooth, and homogenous pale tan. The heart is firm, smooth, homogenous red-pink and otherwise unremarkable. The lungs are collapsed and flat against the body cavity with the right lung most affected. The spleen is firm, smooth, and homogenous red-brown. The kidneys are firm, smooth, and homogenous brown. The bladder is tan-pink and free of parasites. The brain is smooth, firm, and homogenous tan-pink. The salt glands are very red. There is bleeding in the tongue musculature. The esophageal mucosa is smooth and homogenous tan. The intestines are gas-filled and mostly empty. No lesions are seen in the brain, pericardial sac, heart valves, tracheal lumen, gall bladder, gastrointestinal mucosa and serosa, gonads, adrenal and thyroid glands, pancreas and superficial and cut surface of heart, kidney, and spleen.

Preliminary Diagnosis: Collapsed lungs Exam Type: (GO)
Sex (F) Age (I)/() Body Cond. (G) Postmortem State (G) Giz. Lead ()/()

Samples saved:

1. Histo: Brain, skeletal muscle (A); spleen, kidney (B); lung (C); liver (D); heart, skeletal muscle (E); skeletal muscle, thymus, esophagus (F); small intestines (G); salt gland, skeletal muscle (H); trachea (I); large intestines, esophagus (J).
2. Frozen: muscle, submandibular muscle, liver(2), kidney(2), stom contents, intestinal contents.

TOXICOLOGY: Liver was negative for Warfarin, Bromdiolone, Coumachlor, Brodifactoum, Diphacinone, Chlorophacinone, Difethialone. Kidney was negative for Paraquat (UC Davis Veterinary Diagnostics Laboratory).

HISTOPATHOLOGY:

Lung: There are small numbers of round and bipolar trematode eggs.

Salt gland: There are small numbers of trematode eggs near the lumen.

Brain: Rare round trematode eggs are seen surrounded by macrophages.

Spleen: There are moderate numbers of bipolar trematode eggs.

Kidney: There are small numbers of bipolar trematode eggs.

Esophagus: Occasional submucosal lymphoid nodules are seen.

Small Intestine: There is a small number of granulocytes infiltrating the submucosa.

All other tissues: No remarkable lesions are seen.

Morphologic Diagnoses:

- 1) Mild, focal, chronic, inflammation with trematode eggs, lung, brain, salt gland, spleen, kidney.

Histopathology (cont.)

Comments: Grossly, the suspected cause of death is collapse of the lungs secondary to excessive accumulation of air in the coelomic cavity. No microscopic lesions indicative of cause of death were seen although tissues were moderately autolyzed. No explanation was seen for the marked swelling of skeletal muscle and excessive air in the coelomic cavity. There was no evidence of poisoning by paraquat or anticoagulant rodenticides.

Final Diagnosis (in order of importance)

	topog.	morph.	etiol.	funct.	disease	link
1. <u>Undetermined</u>	(T00010)	()	(E00040)	(FY3500)	()	()
2. _____	()	()	()	()	()	()
3. _____	()	()	()	()	()	()

Diagnostic findings may not be used for publication without the pathologist's knowledge and consent.

COD (01)

NATIONAL WILDLIFE HEALTH CENTER
NECROPSY REPORT

Submitter's Name, Affiliation Address
Mr. George Balazs
NOAA-NMFS-SWFC
2570 Dole Street
Honolulu, HI 96822

Case: 17906
Accession: 003
Collected: 00/00/2004
Exam Date: 12/03/2004
Pathologist: T.M. Work
Prosector: T.M. Work

Species: Green turtle Specimen: Carcass
Bandtype: (N) Ref/Band No: (3 dots) Euth: (N) Weight (Gm): (7727)
History Summary: This animal was found dead in the lagoon of Le Meridien-Bora Bora in Tahiti and shipped to Honolulu for necropsy. Body measurements (cm): SCL-37.3, SCW-32.7, plastron length-30.5, notch length-36.9, CCL-40.0, CCW-37.0.

EXTERNAL/INTERNAL OBSERVATIONS - LABORATORY RESULTS

External: There are 3 mototool dots on the 3rd lateral left scute. The eyes are sunken.

Internal: The liver is firm, smooth, and homogenous red-brown. The heart is firm, smooth, homogenous purple-pink and otherwise unremarkable. The lungs are spongy and homogenous red-pink. The spleen is firm, smooth, and homogenous red-brown. The kidneys are firm, smooth, and homogenous brown. The brain is smooth, firm, and homogenous tan-pink. The esophageal mucosa is smooth and homogenous tan. The intestines are homogenous tan. No lesions are seen in the brain, musculoskeletal system, pericardial sac, heart valves, tracheal lumen, gall bladder, gastrointestinal mucosa and serosa, gonads, adrenal and thyroid glands, pancreas and superficial and cut surface of liver, heart, kidney, spleen, and lungs.

Preliminary Diagnosis: Undetermined Exam Type: (GO)
Sex (F) Age (I)/() Body Cond. (G) Postmortem State (G) Giz. Lead ()/()
Samples saved:

1. Histo: Brain (A); lung, spleen (B); kidney (C); heart (D); thymus, salt gland, stomach (E); small intestine (F); liver (G).
2. Frozen: liver(2), kidney(3), stom contents.

TOXICOLOGY: Liver was negative for Warfarin, Bromdiolone, Coumachlor, Brodifactoum, Diphacinone, Chlorophacinone, Difethialone. Kidney was negative for Paraquat (UC Davis Veterinary Diagnostics Laboratory).

HISTOPATHOLOGY:

Lung: There are small numbers of trematode eggs within smooth muscle wall.

Spleen: There are small numbers of trematode eggs.

Stomach: There are small numbers of trematode eggs within the lamina propria some of which are accompanied by macrophages.

Small Intestine: There are small numbers of trematode eggs within the lamina propria some of which are accompanied by macrophages.

All other tissues: No remarkable lesions are seen.

Morphologic Diagnoses:

- 1) Mild, focal, chronic, inflammation with trematode eggs, small intestines, stomach, spleen, lung.

Comments: No gross or microscopic lesions indicative of cause of death were seen. However, this must be qualified by the poor state of preservation of tissues that could have masked subtle lesion. There was no evidence of poisoning by paraquat or anticoagulant rodenticides.

Final Diagnosis (in order of importance)

	topog.	morph.	etiol.	funct.	disease	link
1. <u>Undetermined</u>	(T00010)	()	(E00040)	(FY3500)	()	()
2. _____	()	()	()	()	()	()
3. _____	()	()	()	()	()	()

Diagnostic findings may not be used for publication without the pathologist's knowledge and consent.

NATIONAL WILDLIFE HEALTH CENTER
NECROPSY REPORT

Submitter's Name, Affiliation Address

Mr. George Balazs
NOAA-NMFS-SWFC
2570 Dole Street
Honolulu, HI 96822

Case: 17906
Accession: 004
Collected: 00/00/2004
Exam Date: 12/03/2004
Pathologist: T.M. Work
Prosector: T.M. Work

Species: Green turtle Specimen: Carcass
Bandtype: (N) Ref/Band No: (Shark) Euth: (N) Weight (Gm): (unknown)
History Summary: Formalin-fixed tissues from this animal found dead in the lagoon of Le Meridien-Bora Bora in Tahiti were shipped to Honolulu for histopathological examination.
Specimen identification: Tortue Shark.

External: No necropsy report.

Internal: No necropsy report.

Preliminary Diagnosis: Undetermined Exam Type: (GO)
Sex (U) Age (U)/() Body Cond. (U) Postmortem State (U) Giz. Lead ()/()
Samples saved:

1. Histo: liver (A); esophagus (B-C).

HISTOPATHOLOGY:

Esophagus: There are foci of mucosal necrosis and focal lymphoid infiltrate in the submucosa.

All other tissues: No remarkable lesions are seen.

Morphologic Diagnoses:

- 1) Mild, focal, necrosis and chronic inflammation, mucosa, esophagus.

Comments: The liver section was markedly autolyzed precluding adequate histologic interpretation. No lesions indicative of cause of death were seen.

Final Diagnosis (in order of importance)

	topog.	morph.	etiol.	funct.	disease	link
1. <u>Undetermined</u>	(T00010)	()	(E00040)	(FY3500)	()	()
2. _____	()	()	()	()	()	()
3. _____	()	()	()	()	()	()

Diagnostic findings may not be used for publication without the pathologist's knowledge and consent.

COD (01)

NATIONAL WILDLIFE HEALTH CENTER
NECROPSY REPORT

Submitter's Name, Affiliation Address
Mr. George Balazs
NOAA-NMFS-SWFC
2570 Dole Street
Honolulu, HI 96822

Case: 17906
Accession: 005
Collected: 00/00/2004
Exam Date: 12/03/2004
Pathologist: T.M. Work
Prosector: T.M. Work

Species: Green turtle Specimen: Carcass
Bandtype: (N) Ref/Band No: (Bora) Euth: (N) Weight (Gm): (unknown)
History Summary: Formalin-fixed tissues from this animal found dead in the lagoon of Le Meridien-Bora Bora in Tahiti were shipped to Honolulu for histopathological examination.
Specimen identification: Tortue Bora.

External: No necropsy report.

Internal: No necropsy report.

Preliminary Diagnosis: Undetermined Exam Type: (GO)
Sex (U) Age (U)/() Body Cond. (U) Postmortem State (U) Giz. Lead ()/()
Samples saved:
1. Histo: liver (A-B).

HISTOPATHOLOGY:

Liver: Hepatocytes are markedly vacuolated displacing nuclei to periphery. Many hepatocytes are fragmented and coalesced into pools of eosinophilic material. Rare round trematode eggs are seen with little to no inflammatory response.

Morphologic Diagnoses:

- 1) Severe, diffuse, vacuolar degeneration, hepatocytes, liver.

Comments: The changes in the liver were indicative of either fatty degeneration or vacuolar change secondary to toxicity. Absent additional findings, I cannot determine the cause of those changes.

Final Diagnosis (in order of importance)

	topog.	morph.	etiol.	funct.	disease	link
1. <u>Undetermined</u>	(T00010)	()	(E00040)	(FY3500)	()	()
2. _____	()	()	()	()	()	()
3. _____	()	()	()	()	()	()

Diagnostic findings may not be used for publication without the pathologist's knowledge and consent.

COD (01)

NATIONAL WILDLIFE HEALTH CENTER
NECROPSY REPORT

Submitter's Name, Affiliation Address
Mr. George Balazs
NOAA-NMFS-SWFC
2570 Dole Street
Honolulu, HI 96822

Case: 17906
Accession: 006
Collected: 00/00/2004
Exam Date: 12/03/2004
Pathologist: T.M. Work
Prosector: T.M. Work

Species: Green turtle Specimen: Carcass
Bandtype: (N) Ref/Band No: (Tortue 11) Euth: (N) Weight (Gm): (unknown)
History Summary: Formalin-fixed tissues from this animal found dead in the lagoon of Le Meridien-Bora Bora in Tahiti were shipped to Honolulu for histopathological examination.
Specimen identification: Tortue 11.

External: No necropsy report.

Internal: No necropsy report.

Preliminary Diagnosis: Undetermined Exam Type: (GO)
Sex (U) Age (U)/() Body Cond. (U) Postmortem State (U) Giz. Lead ()/()
Samples saved:

1. Histo: Brain (A); esophagus, stomach (B); small intestines, stomach (C); small and large intestines, pancreas (D).

HISTOPATHOLOGY:

Brain: There is focal swelling and liquefaction necrosis of neurons. There are multiple focal infiltrates of melanized macrophages, mononuclear cells and lesser numbers of granulocytes. Rare round trematode eggs with little to no inflammatory response are seen.

Stomach: Rare round trematode eggs with little to no inflammation are seen within submucosa.

Small intestines: Small numbers of round trematode eggs with little to no inflammation are within the submucosa.

Large intestines: Within submucosa are pockets of trematode eggs mixed with trematodes. Trematode eggs in some sections are seen sloughing into lumen along with intact mucosal cells.

All other tissues: No remarkable lesions are seen.

Morphologic Diagnoses:

- 1) Moderate, chronic, trematodiasis, large intestines.
- 2) Severe, focal, chronic and acute, necrosis and inflammation, brain.

Comments: Absent addition history or necropsy findings on this carcass, the cause of the changes in the brain are unknown, however, they may have led to the animal's death. Possible causes include both infectious and non-infectious.

Final Diagnosis (in order of importance)

	topog.	morph.	etiol.	funct.	disease	link
1. <u>Undetermined</u>	(T00010)	()	(E00040)	(FY3500)	()	()
2. _____	()	()	()	()	()	()
3. _____	()	()	()	()	()	()

Diagnostic findings may not be used for publication without the pathologist's knowledge and consent. COD (01)

NATIONAL WILDLIFE HEALTH CENTER
NECROPSY REPORT

Submitter's Name, Affiliation Address

Mr. George Balazs
NOAA-NMFS-SWFC
2570 Dole Street
Honolulu, HI 96822

Case: 17906
Accession: 007
Collected: 00/00/2004
Exam Date: 12/03/2004
Pathologist: T.M. Work
Prosector: T.M. Work

Species: Green turtle Specimen: Carcass
Bandtype: (N) Ref/Band No: (Naomi) Euth: (N) Weight (Gm): (unknown)
History Summary: Formalin-fixed tissues from this animal found dead in the lagoon of Le Meridien-Bora Bora in Tahiti were shipped to Honolulu for histopathological examination.
Specimen identification: Tortue Naomi.

External: No necropsy report.

Internal: No necropsy report.

Preliminary Diagnosis: Undetermined Exam Type: (GO)
Sex (U) Age (U)/() Body Cond. (U) Postmortem State (U) Giz. Lead ()/()
Samples saved:

1. Histo: Heart, unknown (A); heart, large arteries (B-C); esophagus (D); small intestines, stomach (E); kidney, liver (F); small and large intestines, pancreas (D).
liver, kidney (E); lung (F); lung, unknown (H).

HISTOPATHOLOGY:

Lung: Small numbers of round trematode eggs are seen

Liver: Small numbers of bipolar trematode eggs are seen.

Kidney: An adult trematode is seen within an artery.

All other tissues: No remarkable lesions are seen.

Morphologic Diagnoses:

- 1) Mild, focal, trematodiasis, lung, kidney, liver.

Comments: Tissues were fairly autolyzed which obscured much cellular detail. However, no microscopic lesions indicative of cause of death were seen.

Final Diagnosis (in order of importance)

	topog.	morph.	etiol.	funct.	disease	link
1. <u>Undetermined</u>	(T00010)	()	(E00040)	(FY3500)	()	()
2. _____	()	()	()	()	()	()
3. _____	()	()	()	()	()	()

Diagnostic findings may not be used for publication without the pathologist's knowledge and consent.

COD (01)

Copy

DIAGNOSTIC CASE REPORT

U. S. GEOLOGICAL SURVEY-BIOLOGICAL RESOURCES DIVISION
NATIONAL WILDLIFE HEALTH CENTER-HONOLULU FIELD STATION
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HONOLULU, HAWAII 96850
808-792-9520, FAX 792-9596, thierry_work@usgs.gov

Case # 17906

Epizoo #

Submitter:

Mr. George Balazs
NOAA-NMFS-SWFC
2570 Dole Street
Honolulu, HI 96822-2396

Specimen description/identification:

Carcasses and fixed tissues from 3 and 4 green turtles, respectively.

Date Submitted: (12/03/2004) (mm/dd/yy) **Date Collected:** (See below) (mm/dd/yy) **Date Examined:** (12/03/2004) (mm/dd/yy)

Location: Le Meridien Hotel, Bora Bora

County/Site: Tahiti

HISTORY: These animals were raised at Le Meridien Hotel in Bora Bora and were part of an unusual mortality in the hotel lagoon. Date of collection for all turtles unknown.

SIGNIFICANT FINDINGS: A variety of gross and microscopic findings were seen none of which, except for one case, could explain the cause of death. Tissues analyzed for anticoagulants and paraquat (turtles 1 and 2) were negative for both toxicants.

Accession	TurtleID	SCL	AGE	SEX	DIAGNOSIS	SUMMARY OF FINDINGS
1	None	25.5	I	F	Fluke infection	Massive trematode eggs in tissues.
2	2 dots	37.3	I	F	Undetermined	Collapsed lungs
3	3 dots	42.1	I	F	Undetermined	Mild trematode eggs in tissues
4	Shark	NA	NA	NA	Undetermined	Autolyzed tissues
5	Bora	NA	NA	NA	Undetermined	Vacuolar degeneration of liver.
6	Tortue 11	NA	NA	NA	Undetermined	Severe brain inflammation.
7	Naomi	NA	NA	NA	Undetermined	Mild trematode eggs in tissues

COMMENTS: No unifying cause of death could be seen for all these turtles. In many cases, tissues were too decomposed or autolyzed to make a good assessment. In the future, it would be helpful, if we're to sort out this mortality, to have the following information for animals submitted: Date and location of collection, size, weight, sex, necropsy findings (if done), and preservation of fresh non-frozen tissues in 10% buffered formalin. If possible, careful necropsies with collection of fresh tissues would be helpful. A turtle necropsy report is available online at www.nwhc.usgs.gov/hfs/products.htm.

MANAGEMENT: None given unknown etiologies of death for most turtles.

_____ Preliminary Report (/ /) _____ X _____ Final Report (03/07/2005)
date date

Necropsy report is: enclosed _____ available upon request.

_____: Copies of this report sent to:

If you have questions regarding this case, contact Thierry M. Work MS, DVM, MPVM at 808-792-9520. Include above Case Number. Diagnostic findings may not be used for publication without the pathologist's knowledge and consent.

NATIONAL WILDLIFE HEALTH CENTER
NECROPSY REPORT

Submitter's Name, Affiliation Address
Mr. George Balazs
NOAA-NMFS-SWFC
2570 Dole Street
Honolulu, HI 96822

Case: 17906
Accession: 001
Collected: 00/00/2004
Exam Date: 12/03/2004
Pathologist: T.M. Work
Prosector: T.M. Work

Species: Green turtle Specimen: Carcass
Bandtype: (N) Ref/Band No: () Euth: (N) Weight (Gm): (1800)
History Summary: This animal was found dead in the lagoon of Le Meridien-Bora Bora in Tahiti and shipped to Honolulu for necropsy. Body measurements (cm): SCL-25.5, SCW-22.7, RFF width-4.8, plastron length-21.1, notch length-25.3, head width-4.4.

EXTERNAL/INTERNAL OBSERVATIONS - LABORATORY RESULTS

External: No remarkable lesions are seen.

Internal: The liver is firm, smooth, and homogenous purple-brown. The heart is firm, smooth, homogenous red-pink and otherwise unremarkable. The lungs are spongy and homogenous pink. The spleen is firm, smooth, and homogenous red-brown. The kidneys are firm, smooth, and homogenous brown. The brain is smooth, firm, and homogenous tan-pink. The esophageal mucosa is smooth and homogenous tan. The intestines are tan and the serosa contains numerous black nodules. No lesions are seen in the brain, musculoskeletal system, pericardial sac, heart valves, tracheal lumen, gall bladder, gastrointestinal mucosa and serosa, gonads, adrenal and thyroid glands, pancreas and superficial and cut surface of liver, heart, kidney, spleen, and lungs.

Preliminary Diagnosis: Undetermined Exam Type: (GO)
Sex (F) Age (I) / () Body Cond. (G) Postmortem State (G) Giz. Lead () / ()
Samples saved:

1. Histo: Brain (A); kidney, spleen, pancreas (B); lung, liver (C); heart (D); small and large intestines, pancreas (E); thyroid, mesentery (F).

HISTOPATHOLOGY:

Lung: There are massive numbers of trematode within smooth muscle walls. Two types of eggs are seen, round eggs and eggs with bipolar spines that appear to elicit a more severe inflammatory response.

Thyroid: There are moderate numbers of trematode eggs. Two types of eggs are seen, round eggs and eggs with bipolar spines that appear to elicit a more severe inflammatory response. Round eggs appear more numerous.

Liver: There are moderate numbers of trematode eggs. Two types of eggs are seen, round eggs and eggs with bipolar spines that appear to elicit a more severe inflammatory response. More round eggs are seen.

Heart: There are moderate numbers of trematode eggs. Two types of eggs are seen, round eggs and eggs with bipolar spines that appear to elicit a more severe inflammatory response. More round eggs are seen.

Brain: There are small numbers of trematode eggs associated with macrophages and giant cells. Two types of eggs are seen, round eggs and eggs with bipolar spines that appear to elicit a more severe inflammatory response.

Spleen: There are numerous trematode eggs. Two types of eggs are seen, round eggs and eggs with bipolar spines that appear to elicit a more severe inflammatory response.

Kidney: There are moderate numbers of trematode eggs among proximal tubules. Two types of eggs are seen, round eggs and eggs with bipolar spines that appear to elicit a more severe inflammatory response.

Pancreas: There are moderate numbers of trematode eggs among proximal tubules. Two types of eggs are seen, round eggs and eggs with bipolar spines that appear to elicit a more severe inflammatory response.

Histopathology (Cont.)

Pancreas: There are large numbers of trematode eggs. Two types of eggs are seen, round eggs and eggs with bipolar spines that appear to elicit a more severe inflammatory response.

Small Intestine: There are large numbers of trematode eggs within the submucosa and serosa. Two types of eggs are seen, round eggs and eggs with bipolar spines that appear to elicit a more severe inflammatory response. More round eggs are seen. Adult trematodes are present within mesenteric arteries.

Morphologic Diagnoses:

1) Moderate to severe, diffuse, chronic, inflammation with trematode eggs, lungs, liver, spleen, kidney, thyroid, intestines, brain, pancreas.

Comments: This turtle had massive numbers of trematode eggs in multiple organs, particularly the lungs. Although no necrosis was seen associated with these eggs, their sheer numbers makes it difficult to conceive that they did not have something to do with the animal's death.

Final Diagnosis (in order of importance)

	topog.	morph.	etiol.	funct.	disease	link
1. <u>Fluke infection</u>	(T41000)	(M40000)	()	(F01310)	()	()
2. _____	()	()	()	()	()	()
3. _____	()	()	()	()	()	()

Diagnostic findings may not be used for publication without the pathologist's knowledge and consent.

NATIONAL WILDLIFE HEALTH CENTER
NECROPSY REPORT

Submitter's Name, Affiliation Address

Mr. George Balazs
NOAA-NMFS-SWFC
2570 Dole Street
Honolulu, HI 96822

Case: 17906
Accession: 002
Collected: 00/00/2004
Exam Date: 12/03/2004
Pathologist: T.M. Work
Prosector: T.M. Work

Species: Green turtle Specimen: Carcass
Bandtype: (N) Ref/Band No: (2 dots) Euth: (N) Weight (Gm): (11364)
History Summary: This animal was found dead in the lagoon of Le Meridien-Bora Bora in Tahiti and shipped to Honolulu for necropsy. Body measurements (cm): SCL-42.1, SCW-34.3, plastron length-35.0, notch length-41.8, CCL-45.0, CCW-42.5.

EXTERNAL/INTERNAL OBSERVATIONS - LABORATORY RESULTS

External: There are 2 mototool dots on the 5th central scute. The carcass is massively swollen and the cloaca is prolapsed.

Internal: There is edema and hemorrhage of the head and pelvic musculature. There is diffuse hemorrhage in the submandibular musculature. The coelomic cavity is filled with air. The liver is firm, smooth, and homogenous pale tan. The heart is firm, smooth, homogenous red-pink and otherwise unremarkable. The lungs are collapsed and flat against the body cavity with the right lung most affected. The spleen is firm, smooth, and homogenous red-brown. The kidneys are firm, smooth, and homogenous brown. The bladder is tan-pink and free of parasites. The brain is smooth, firm, and homogenous tan-pink. The salt glands are very red. There is bleeding in the tongue musculature. The esophageal mucosa is smooth and homogenous tan. The intestines are gas-filled and mostly empty. No lesions are seen in the brain, pericardial sac, heart valves, tracheal lumen, gall bladder, gastrointestinal mucosa and serosa, gonads, adrenal and thyroid glands, pancreas and superficial and cut surface of heart, kidney, and spleen.

Preliminary Diagnosis: Collapsed lungs Exam Type: (GO)
Sex (F) Age (I)/() Body Cond. (G) Postmortem State (G) Giz. Lead ()/()
Samples saved:

1. Histo: Brain, skeletal muscle (A); spleen, kidney (B); lung (C); liver (D); heart, skeletal muscle (E); skeletal muscle, thymus, esophagus (F); small intestines (G); salt gland, skeletal muscle (H); trachea (I); large intestines, esophagus (J).
2. Frozen: muscle, submandibular muscle, liver(2), kidney(2), stom contents, intestinal contents.

TOXICOLOGY: Liver was negative for Warfarin, Bromdiolone, Coumachlor, Brodifactoum, Diphacinone, Chlorophacinone, Difethialone. Kidney was negative for Paraquat (UC Davis Veterinary Diagnostics Laboratory).

HISTOPATHOLOGY:

Lung: There are small numbers of round and bipolar trematode eggs.

Salt gland: There are small numbers of trematode eggs near the lumen.

Brain: Rare round trematode eggs are seen surrounded by macrophages.

Spleen: There are moderate numbers of bipolar trematode eggs.

Kidney: There are small numbers of bipolar trematode eggs.

Esophagus: Occasional submucosal lymphoid nodules are seen.

Small Intestine: There is a small number of granulocytes infiltrating the submucosa.

All other tissues: No remarkable lesions are seen.

Morphologic Diagnoses:

- 1) Mild, focal, chronic, inflammation with trematode eggs, lung, brain, salt gland, spleen, kidney.

Histopathology (cont.)

Comments: Grossly, the suspected cause of death is collapse of the lungs secondary to excessive accumulation of air in the coelomic cavity. No microscopic lesions indicative of cause of death were seen although tissues were moderately autolyzed. No explanation was seen for the marked swelling of skeletal muscle and excessive air in the coelomic cavity. There was no evidence of poisoning by paraquat or anticoagulant rodenticides.

Final Diagnosis (in order of importance)

	topog.	morph.	etiol.	funct.	disease	link
1. <u>Undetermined</u>	(T00010)	()	(E00040)	(FY3500)	()	()
2. _____	()	()	()	()	()	()
3. _____	()	()	()	()	()	()

Diagnostic findings may not be used for publication without the pathologist's knowledge and consent.

COD (01)

**NATIONAL WILDLIFE HEALTH CENTER
NECROPSY REPORT**

Submitter's Name, Affiliation Address

Mr. George Balazs
NOAA-NMFS-SWFC
2570 Dole Street
Honolulu, HI 96822

Case: 17906
Accession: 003
Collected: 00/00/2004
Exam Date: 12/03/2004
Pathologist: T.M. Work
Prosector: T.M. Work

Species: Green turtle Specimen: Carcass
Bandtype: (N) Ref/Band No: (3 dots) Euth: (N) Weight (Gm): (7727)
History Summary: This animal was found dead in the lagoon of Le Meridien-Bora Bora in Tahiti and shipped to Honolulu for necropsy. Body measurements (cm): SCL-37.3, SCW-32.7, plastron length-30.5, notch length-36.9, CCL-40.0, CCW-37.0.

EXTERNAL/INTERNAL OBSERVATIONS - LABORATORY RESULTS

External: There are 3 mototool dots on the 3rd lateral left scute. The eyes are sunken.

Internal: The liver is firm, smooth, and homogenous red-brown. The heart is firm, smooth, homogenous purple-pink and otherwise unremarkable. The lungs are spongy and homogenous red-pink. The spleen is firm, smooth, and homogenous red-brown. The kidneys are firm, smooth, and homogenous brown. The brain is smooth, firm, and homogenous tan-pink. The esophageal mucosa is smooth and homogenous tan. The intestines are homogenous tan. No lesions are seen in the brain, musculoskeletal system, pericardial sac, heart valves, tracheal lumen, gall bladder, gastrointestinal mucosa and serosa, gonads, adrenal and thyroid glands, pancreas and superficial and cut surface of liver, heart, kidney, spleen, and lungs.

Preliminary Diagnosis: Undetermined Exam Type: (GO)
Sex (F) Age (I) / () Body Cond. (G) Postmortem State (G) Giz. Lead () / ()
Samples saved:

1. Histo: Brain (A); lung, spleen (B); kidney (C); heart (D); thymus, salt gland, stomach (E); small intestine (F); liver (G).
2. Frozen: liver(2), kidney(3), stom contents.

TOXICOLOGY: Liver was negative for Warfarin, Bromdiolone, Coumachlor, Brodifactoum, Diphacinone, Chlorophacinone, Difethialone. Kidney was negative for Paraquat (UC Davis Veterinary Diagnostics Laboratory).

HISTOPATHOLOGY:

Lung: There are small numbers of trematode eggs within smooth muscle wall.

Spleen: There are small numbers of trematode eggs.

Stomach: There are small numbers of trematode eggs within the lamina propria some of which are accompanied by macrophages.

Small Intestine: There are small numbers of trematode eggs within the lamina propria some of which are accompanied by macrophages.

All other tissues: No remarkable lesions are seen.

Morphologic Diagnoses:

- 1) Mild, focal, chronic, inflammation with trematode eggs, small intestines, stomach, spleen, lung.

Comments: No gross or microscopic lesions indicative of cause of death were seen. However, this must be qualified by the poor state of preservation of tissues that could have masked subtle lesion. There was no evidence of poisoning by paraquat or anticoagulant rodenticides.

Final Diagnosis (in order of importance)

	topog.	morph.	etiol.	funct.	disease	link
1. <u>Undetermined</u>	(T00010)	()	(E00040)	(FY3500)	()	()
2. _____	()	()	()	()	()	()
3. _____	()	()	()	()	()	()

Diagnostic findings may not be used for publication without the pathologist's knowledge and consent.

COD (01)

**NATIONAL WILDLIFE HEALTH CENTER
NECROPSY REPORT**

Submitter's Name, Affiliation Address
Mr. George Balazs
NOAA-NMFS-SWFC
2570 Dole Street
Honolulu, HI 96822

Case: 17906
Accession: 004
Collected: 00/00/2004
Exam Date: 12/03/2004
Pathologist: T.M. Work
Prosector: T.M. Work

Species: Green turtle Specimen: Carcass
Bandtype: (N) Ref/Band No: (Shark) Euth: (N) Weight (Gm): (unknown)
History Summary: Formalin-fixed tissues from this animal found dead in the lagoon of Le Meridien-Bora Bora in Tahiti were shipped to Honolulu for histopathological examination.
Specimen identification: Tortue Shark.

External: No necropsy report.

Internal: No necropsy report.

Preliminary Diagnosis: Undetermined Exam Type: (GO)
Sex (U) Age (U)/() Body Cond. (U) Postmortem State (U) Giz. Lead ()/()
Samples saved:

1. Histo: liver (A); esophagus (B-C).

HISTOPATHOLOGY:

Esophagus: There are foci of mucosal necrosis and focal lymphoid infiltrate in the submucosa.

All other tissues: No remarkable lesions are seen.

Morphologic Diagnoses:

- 1) Mild, focal, necrosis and chronic inflammation, mucosa, esophagus.

Comments: The liver section was markedly autolyzed precluding adequate histologic interpretation. No lesions indicative of cause of death were seen.

Final Diagnosis (in order of importance)

	topog.	morph.	etiol.	funct.	disease	link
1. <u>Undetermined</u>	(T00010)	()	(E00040)	(FY3500)	()	()
2. _____	()	()	()	()	()	()
3. _____	()	()	()	()	()	()

Diagnostic findings may not be used for publication without the pathologist's knowledge and consent.

COD (01)

**NATIONAL WILDLIFE HEALTH CENTER
NECROPSY REPORT**

Submitter's Name, Affiliation Address
Mr. George Balazs
NOAA-NMFS-SWFC
2570 Dole Street
Honolulu, HI 96822

Case: 17906
Accession: 005
Collected: 00/00/2004
Exam Date: 12/03/2004
Pathologist: T.M. Work
Prosector: T.M. Work

Species: Green turtle Specimen: Carcass
Bandtype: (N) Ref/Band No: (Bora) Euth: (N) Weight (Gm): (unknown)
History Summary: Formalin-fixed tissues from this animal found dead in the lagoon of Le Meridien-Bora Bora in Tahiti were shipped to Honolulu for histopathological examination.
Specimen identification: Tortue Bora.

External: No necropsy report.

Internal: No necropsy report.

Preliminary Diagnosis: Undetermined Exam Type: (GO)
Sex (U) Age (U)/() Body Cond. (U) Postmortem State (U) Giz. Lead ()/()
Samples saved:
1. Histo: liver (A-B).

HISTOPATHOLOGY:

Liver: Hepatocytes are markedly vacuolated displacing nuclei to periphery. Many hepatocytes are fragmented and coalesced into pools of eosinophilic material. Rare round trematode eggs are seen with little to no inflammatory response.

Morphologic Diagnoses:

- 1) Severe, diffuse, vacuolar degeneration, hepatocytes, liver.

Comments: The changes in the liver were indicative of either fatty degeneration or vacuolar change secondary to toxicity. Absent additional findings, I cannot determine the cause of those changes.

Final Diagnosis (in order of importance)

	topog.	morph.	etiol.	funct.	disease	link
1. <u>Undetermined</u>	(T00010)	()	(E00040)	(FY3500)	()	()
2. _____	()	()	()	()	()	()
3. _____	()	()	()	()	()	()

Diagnostic findings may not be used for publication without the pathologist's knowledge and consent.

COD (01)

**NATIONAL WILDLIFE HEALTH CENTER
NECROPSY REPORT**

Submitter's Name, Affiliation Address
Mr. George Balazs
NOAA-NMFS-SWFC
2570 Dole Street
Honolulu, HI 96822

Case: 17906
Accession: 006
Collected: 00/00/2004
Exam Date: 12/03/2004
Pathologist: T.M. Work
Prosector: T.M. Work

Species: Green turtle Specimen: Carcass
Bandtype: (N) Ref/Band No: (Tortue 11) Euth: (N) Weight (Gm): (unknown)
History Summary: Formalin-fixed tissues from this animal found dead in the lagoon of Le Meridien-Bora Bora in Tahiti were shipped to Honolulu for histopathological examination.
Specimen identification: Tortue 11.

External: No necropsy report.

Internal: No necropsy report.

Preliminary Diagnosis: Undetermined Exam Type: (GO)
Sex (U) Age (U) / () Body Cond. (U) Postmortem State (U) Giz. Lead () / ()
Samples saved:

1. Histo: Brain (A); esophagus, stomach (B); small intestines, stomach (C); small and large intestines, pancreas (D).

HISTOPATHOLOGY:

Brain: There is focal swelling and liquefaction necrosis of neurons. There are multiple focal infiltrates of melanized macrophages, mononuclear cells and lesser numbers of granulocytes. Rare round trematode eggs with little to no inflammatory response are seen.

Stomach: Rare round trematode eggs with little to no inflammation are seen within submucosa.

Small intestines: Small numbers of round trematode eggs with little to no inflammation are within the submucosa.

Large intestines: Within submucosa are pockets of trematode eggs mixed with trematodes. Trematode eggs in some sections are seen sloughing into lumen along with intact mucosal cells.

All other tissues: No remarkable lesions are seen.

Morphologic Diagnoses:

- 1) Moderate, chronic, trematodiasis, large intestines.
- 2) Severe, focal, chronic and acute, necrosis and inflammation, brain.

Comments: Absent addition history or necropsy findings on this carcass, the cause of the changes in the brain are unknown, however, they may have led to the animal's death. Possible causes include both infectious and non-infectious.

Final Diagnosis (in order of importance)

	topog.	morph.	etiol.	funct.	disease	link
1. <u>Undetermined</u>	<u>(T00010)</u>	<u>()</u>	<u>(E00040)</u>	<u>(FY3500)</u>	<u>()</u>	<u>()</u>
2. _____	<u>()</u>	<u>()</u>	<u>()</u>	<u>()</u>	<u>()</u>	<u>()</u>
3. _____	<u>()</u>	<u>()</u>	<u>()</u>	<u>()</u>	<u>()</u>	<u>()</u>

Diagnostic findings may not be used for publication without the pathologist's knowledge and consent. COD (01)

**NATIONAL WILDLIFE HEALTH CENTER
NECROPSY REPORT**

Submitter's Name, Affiliation Address
Mr. George Balazs
NOAA-NMFS-SWFC
2570 Dole Street
Honolulu, HI 96822

Case: 17906
Accession: 007
Collected: 00/00/2004
Exam Date: 12/03/2004
Pathologist: T.M. Work
Prosector: T.M. Work

Species: Green turtle Specimen: Carcass
Bandtype: (N) Ref/Band No: (Naomi) Euth: (N) Weight (Gm): (unknown)
History Summary: Formalin-fixed tissues from this animal found dead in the lagoon of Le Meridien-Bora Bora in Tahiti were shipped to Honolulu for histopathological examination.
Specimen identification: Tortue Naomi.

External: No necropsy report.

Internal: No necropsy report.

Preliminary Diagnosis: Undetermined Exam Type: (GO)
Sex (U) Age (U)/() Body Cond. (U) Postmortem State (U) Giz. Lead ()/()
Samples saved:

1. Histo: Heart, unknown (A); heart, large arteries (B-C); esophagus (D); small intestines, stomach (E); kidney, liver (F); small and large intestines, pancreas (D). liver, kidney (E); lung (F); lung, unknown (H).

HISTOPATHOLOGY:

Lung: Small numbers of round trematode eggs are seen

Liver: Small numbers of bipolar trematode eggs are seen.

Kidney: An adult trematode is seen within an artery.

All other tissues: No remarkable lesions are seen.

Morphologic Diagnoses:

- 1) Mild, focal, trematodiasis, lung, kidney, liver.

Comments: Tissues were fairly autolyzed which obscured much cellular detail. However, no microscopic lesions indicative of cause of death were seen.

Final Diagnosis (in order of importance)

	topog.	morph.	etiol.	funct.	disease	link
1. <u>Undetermined</u>	(T00010)	()	(E00040)	(FY3500)	()	()
2. _____	()	()	()	()	()	()
3. _____	()	()	()	()	()	()

Diagnostic findings may not be used for publication without the pathologist's knowledge and consent. COD (01)



United States Department of the Interior

U. S. GEOLOGICAL SURVEY
National Wildlife Health Center
Honolulu Field Station
300 Ala Moana Blvd, P. O. Box 50167
Honolulu, Hawaii 96850
Phone: 808 792-9520, Fax: 808 792-9596
E-mail: thierry_work@usgs.gov

January 8, 2007

Dear George:

Objective: Examine snails collected by G. Balazs in Bora Bora in attempts to detect intermediate host of turtle trematodes:

1) I categorized snails into 20 Morphological types:



- 2) Snails were dissected and examined for sporocysts of digenetic trematodes (Yamaguti, S. 1975. A symoptical review of life histories of digenetic trematodes of vertebrates. Keikagu Publsihing, Tokyo, pp. 125-184.)

Four bags of snails were received:

Bag 11/22/2006	n	Bag 11-23- 06 Night	n	Bag 11-22- 06 Night	n	Bag 11-23- 06 S. Side	n
Type 1	11	Type 01	74	Type 01	74	Type 01	42
Type 3	17	Type 03	20	Type 03	3	Type 02	19
Type 4	1	Type 04	1	Type 12	3	Type 03	52
		Type 05	3			Type 04	4
		Type 06	3			Type 06	2
		Type 07	1			Type 07	5
		Type 08	1			Type 08	10
		Type 09	1			Type 09	5
		Type 10	1			Type 13	4
		Type 11	1			Type 15	4
		Type 13	3			Type 16	4
		Type 14	7				
		Type 15	2				
		Type 17	22				
		Type 18	5				
		Type 19	2				
		Type 20	3				
Total	29		95		80		113

All snails were negative for sporocysts.

Recommendations:

I spoke with Dr. Tom Platt at Saint Mary's College (Indiana, USA) who specializes in trematodes of reptiles. In the future, he suggested the collection live snails, holding them in seawater for 2-3 day and seeing if they shed cercaria. This is a lot more efficient system of detecting what snails could be infected since many animals can be screened at once. In his experience, infection rate runs anywhere from 2-5 %. This is something we may want to try with snails from Oahu. As far as Bora Bora, it is at this point difficult to say which snails should be targeted for examination since all were negative.

In the meantime, it is critical that Bora Bora preserve tissues of dead turtles in formalin as per the necropsy manual online (www.nwhc.uqs.gov/hfs/Projects.htm) to help arrive at more definitive conclusions as to cause of death.

Thierry M. Work
Wildlife Disease Specialist

IMPORTANT

Vous avez le privilège de cotoyer nos tortues dans leur environnement naturel. Pour que cette expérience se poursuive, il est vital de respecter les consignes suivantes :



Ne nourrissez pas les tortues, cela pourrait leur être fatal.



Ne stressez pas les tortues, déplacez vous en douceur.

Ne touchez pas les tortues, la crème solaire endommage leur peau.

Si vous souhaitez assister au repas des tortues, adressez-vous à l'équipe de plage.

Merci de votre coopération, indispensable au succès de cette action.



La conception, la mise en place et le suivi de l'écosystème sont effectués par le bureau d'étude S. N. C. Pae Tai-Pae Uta .

E-mail : ptpu@mail.pf

Le **MERIDIEN**

BORA BORA

BP 190 Vaitape Bora Bora

French Polynesia

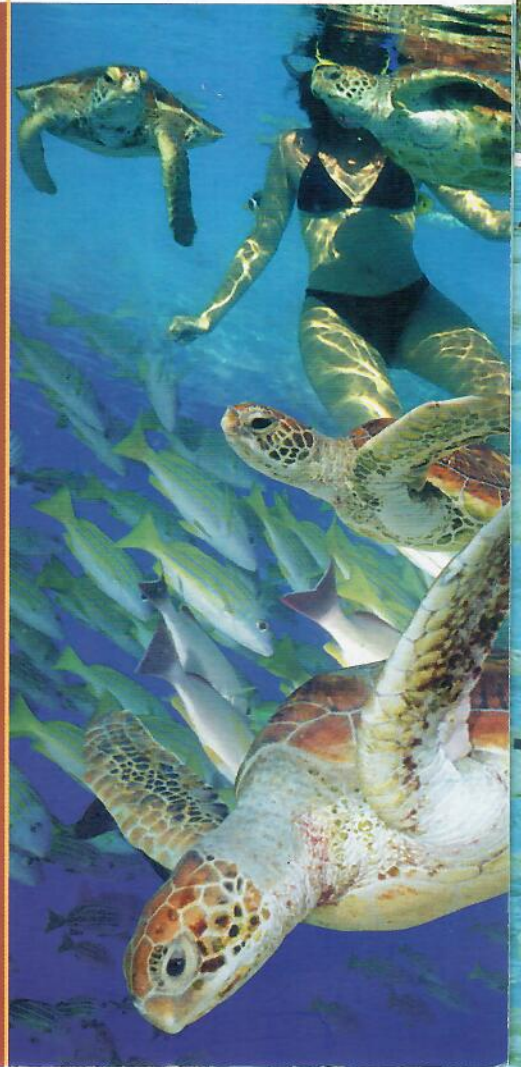
Tél. : (689) 60.51.51

Fax : (689) 60.51.52

Web : <http://www.lemeridien-borabora.com>

Le **MERIDIEN**
BORA BORA

Les Tortues



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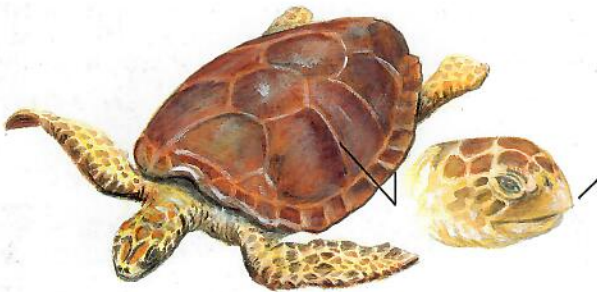
Turtles in French Polynesia

In French Polynesia, the turtle is sacred (*tabu*) since the beginning of time. However, although the species is protected by the Washington Convention and local regulations, it is in danger of becoming extinct if we do not take care.

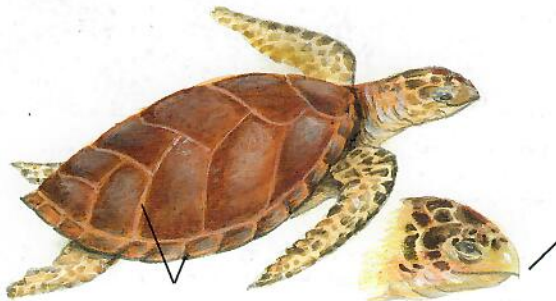
Two species of turtle are common in French Polynesia

The species you will encounter most frequently in the Bora Bora lagoon and in the Meridien lagoon is the green turtle (owing to the green colour of its fat), or *Chelonia mydas*. These turtles return regularly to the same beaches to lay their eggs between the months of October and February.

The green turtle (*Chelonia mydas*) measures between 80 - 150 cm and weighs approximately 230 kg



The overlapped turtle (*Eretmochelys imbricata*) measures less than 90 cm and weighs 50 Kg in average. We recognize this turtle by its beak and by the beauty of its scales.



The Meridien Action - Plan

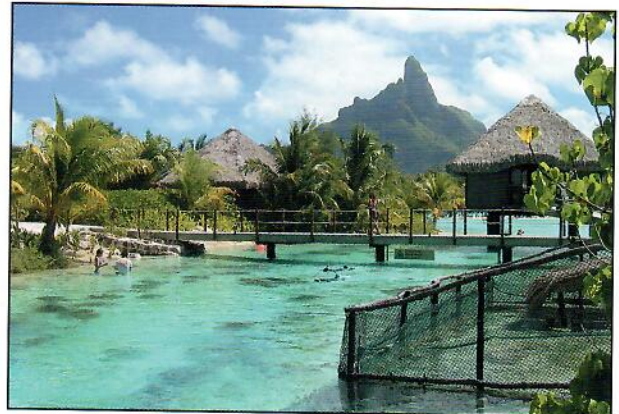
The Meridien Bora Bora actively participates in the protection of this species. A special programme has been implemented to ensure the successful future release of the turtles in the ocean.

Care



In coordination with the Ministry and the Delegation of the Environment, a team is devoted to the care and treatment of the marine turtle. This care center, situated in the heart of the hotel, is unique in the world.

Nursery



Every year, baby turtles are entrusted to this center where they will be assured sufficient growth for protection from future predators.

The juvenile turtles are typically carnivorous, and feed on tiny invertebrate, plankton and fish-eggs. Adult turtles, on the contrary, are herbivorous.