

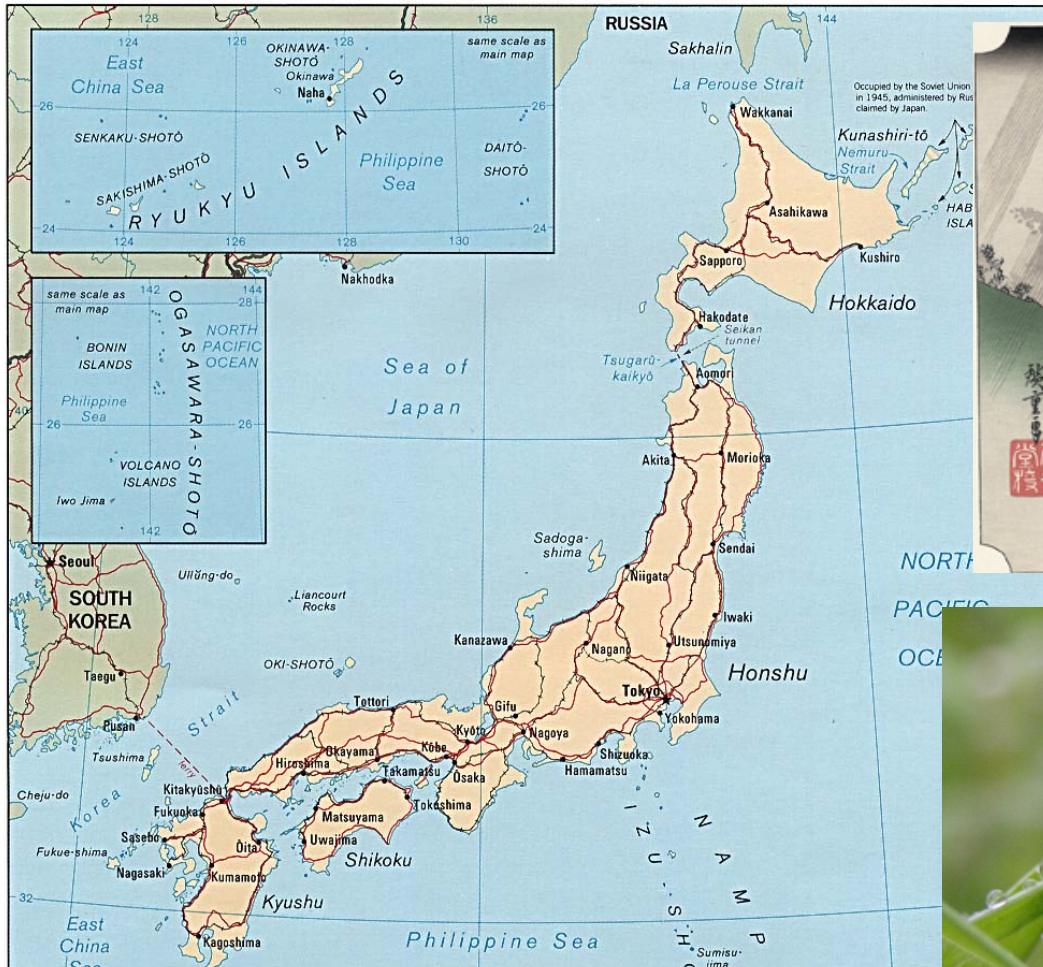


Aspergillosis in wild and captive birds in Japan

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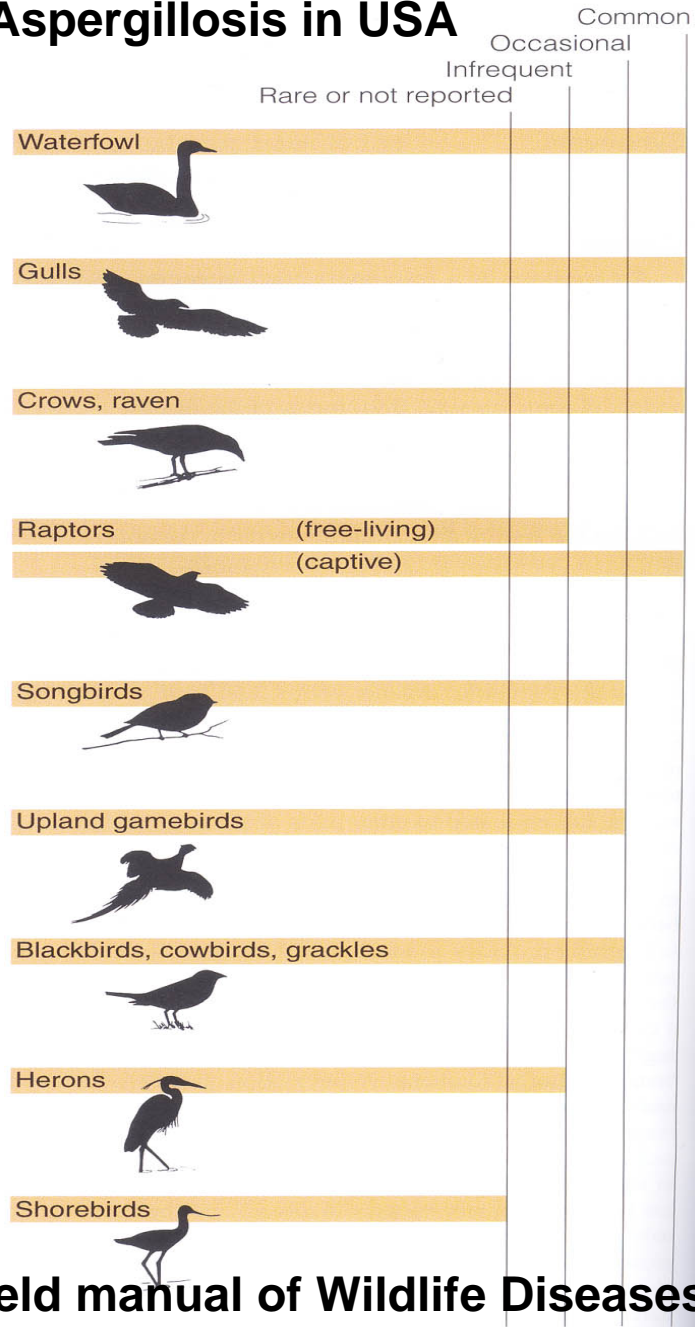




Japan is long islands located in far north of Asian monsoon area. We have a clear rainy season with frequent rainy days named “Tuyu” from the end of May to the end of July.



Aspergillosis in USA



“Field manual of Wildlife Diseases”
USGS

Aspergillosis in Japan

1. Penguins



2. Pet birds



3. Raptors



4. Cormorants



5. Swan



A wide variety of both wild and captive birds have died of aspergillosis in Japan; more frequent cases were found among captive birds and those in zoos and aquariums.






About penguins

- Penguins (order Sphenisciformes, family Spheniscidae) are a group of aquatic, flightless birds living in the southern hemisphere.
- Highly adapted for life in the water, penguins have countershades dark and white plumage, and their wings have become flippers.
- Kept in zoos and aquariums all over the world.
- **There are about 3,500 penguins in Japan, in the world.**

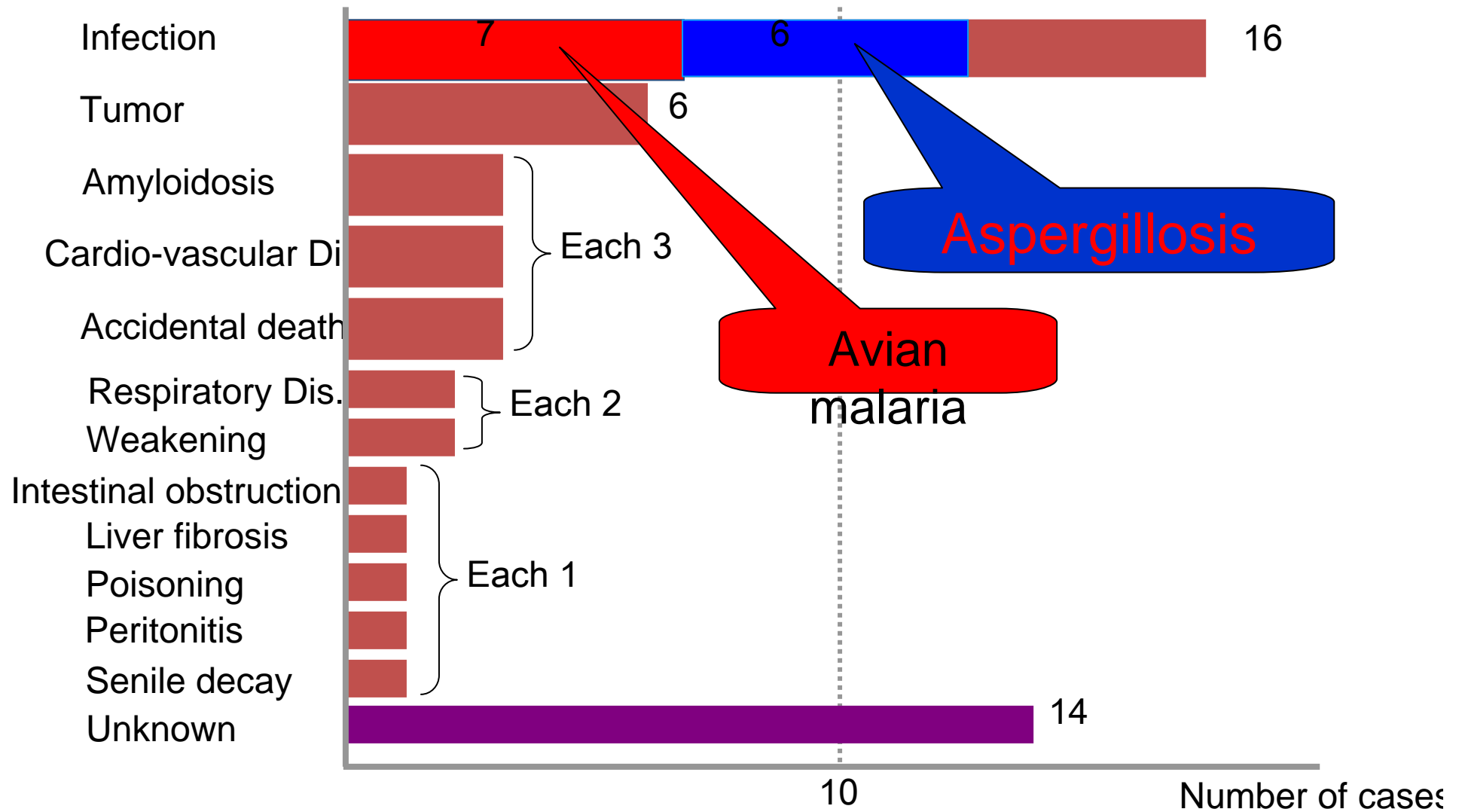
The most frequent aspergillosis cases were seen in flocks of various sub-species of penguins maintained in zoos and aquariums.

Penguins

- Retrospective cases of penguins in Gifu University :2004~2008

Penguins		cases
Humboldt		36
King		7
cape		4
macaroni		4
Rock hopper		4
Total		56

Cause of death of 56 penguins (2004-2008)



Before 2004, 10 of 42 penguins were died of aspergillosis (28.3%)

Penguin Cases

- Macaroni penguin ♂ Ad

■ Clinical episodes

2008.06.16 The first examination. **Coughing** after the meal

2008.06.17 **No appetite.** Suspected mycosis by **X ray micrograph.**

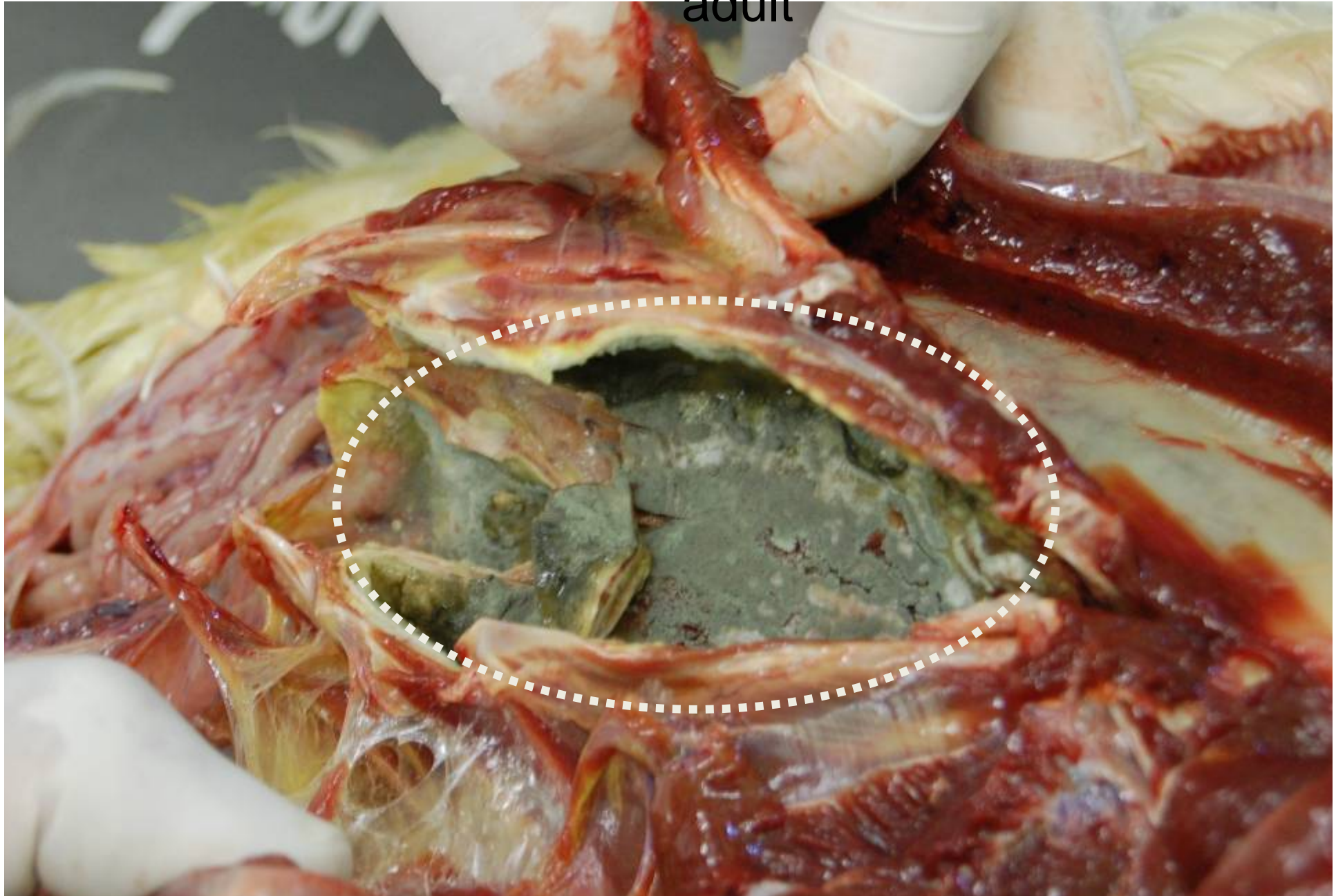
2008.06.18 Administration of anti-fungi drugs (itraconazole). There were vomiting, coughing and bloody feces.

2008.07.02 Poor health condition.

2008.08.03 Found dead.

Aspergillosis (air sacs)

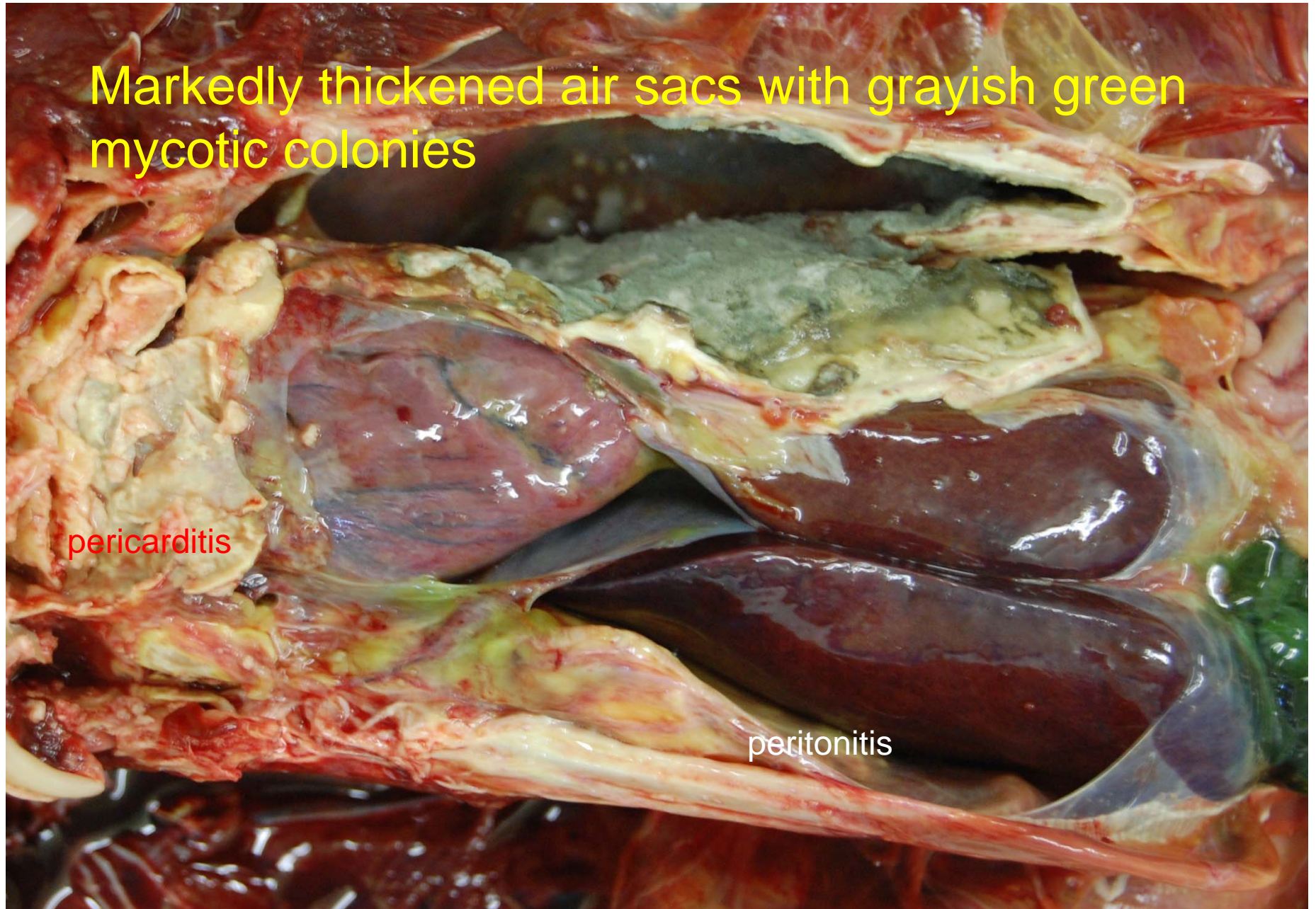
Macaroni penguin, male adult



Markedly thickened air sacs with grayish green mycotic colonies

pericarditis

peritonitis

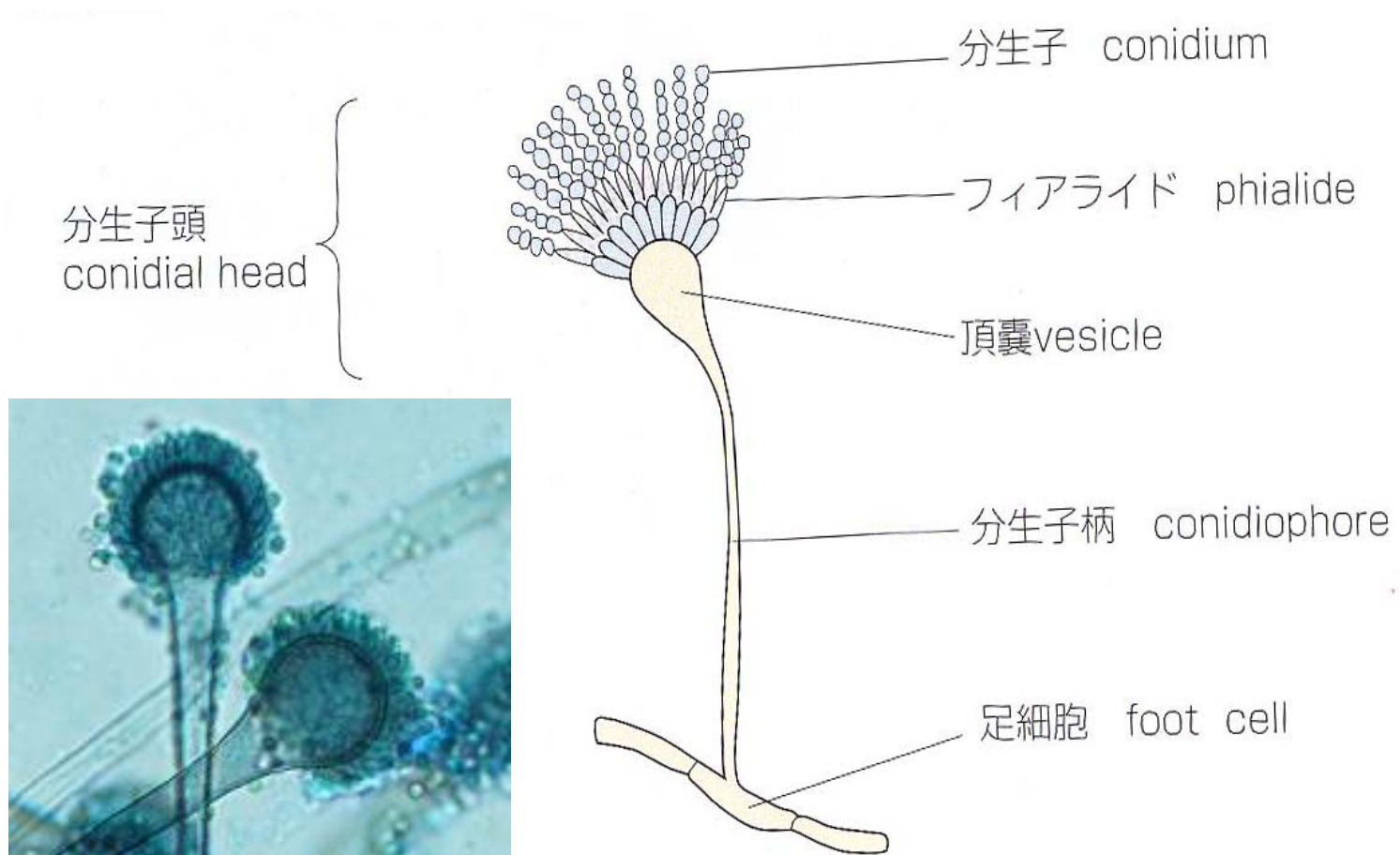


There are many vesicles, which is one of characteristics of *Aspergillus* spp.

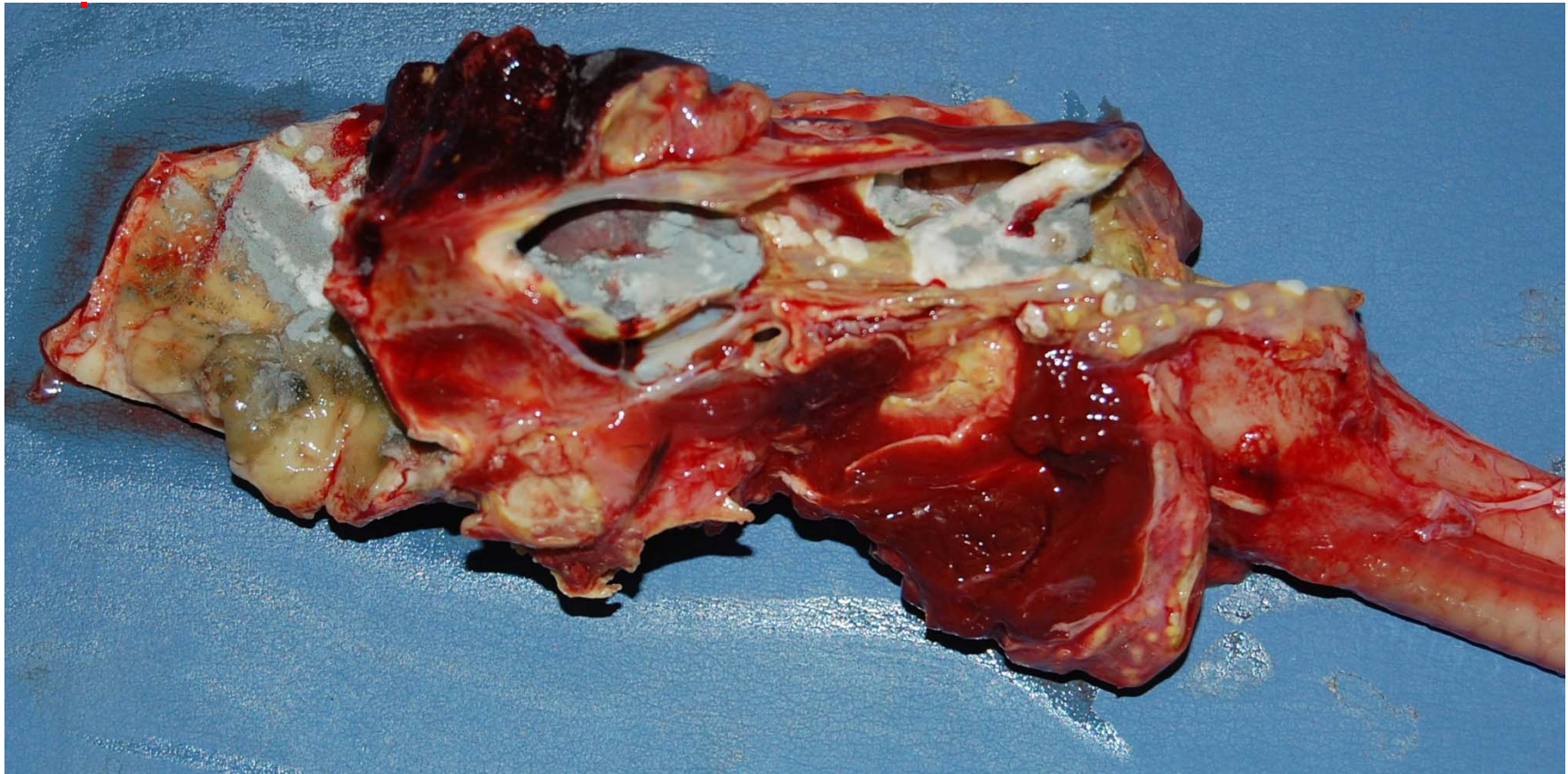


Morphological features of *Aspergillus* s

- This fungus has a conidium with specific morphology named the phialoconidium or phialide.



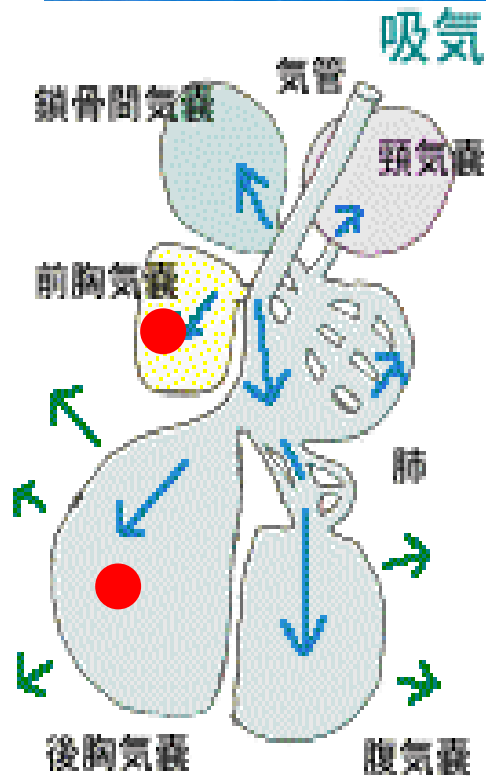
There were multiple necrotic areas with cavities, grayish-white to yellow in color, around the esophagus and the lungs. The cavities contained mycotic colonies. By culture of a colony, *aspergillus spp* was isolated and diagnosed *aspergillus fumigatus* by PCR.





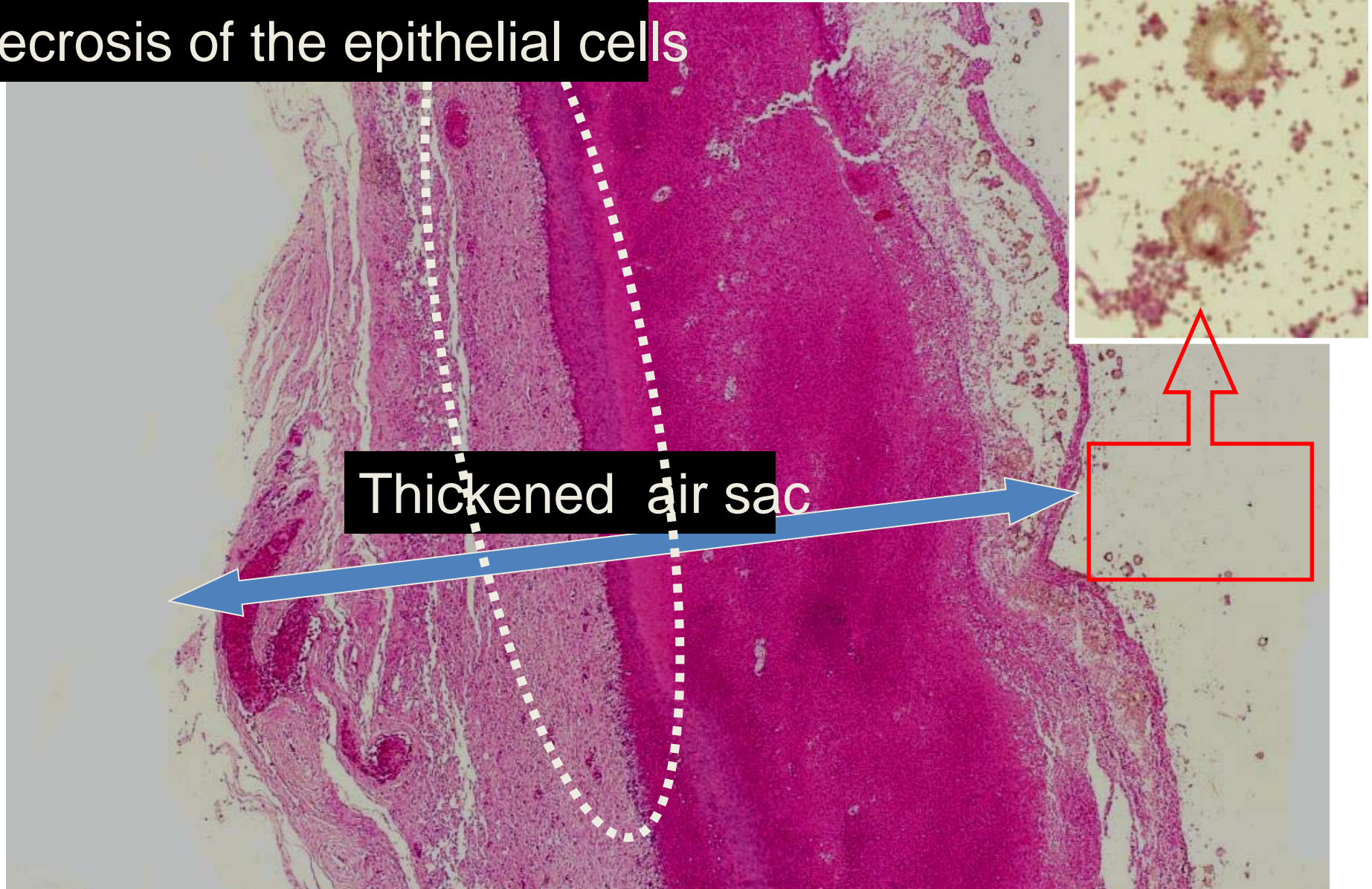
- After fixation, multi-focal necrosis became more clear in the lung.

Affection usually occurred in the cranial and caudal thoracic air sacs.



Histologically, the air sac was thickened with layers of pus and *aspergillus spp.*

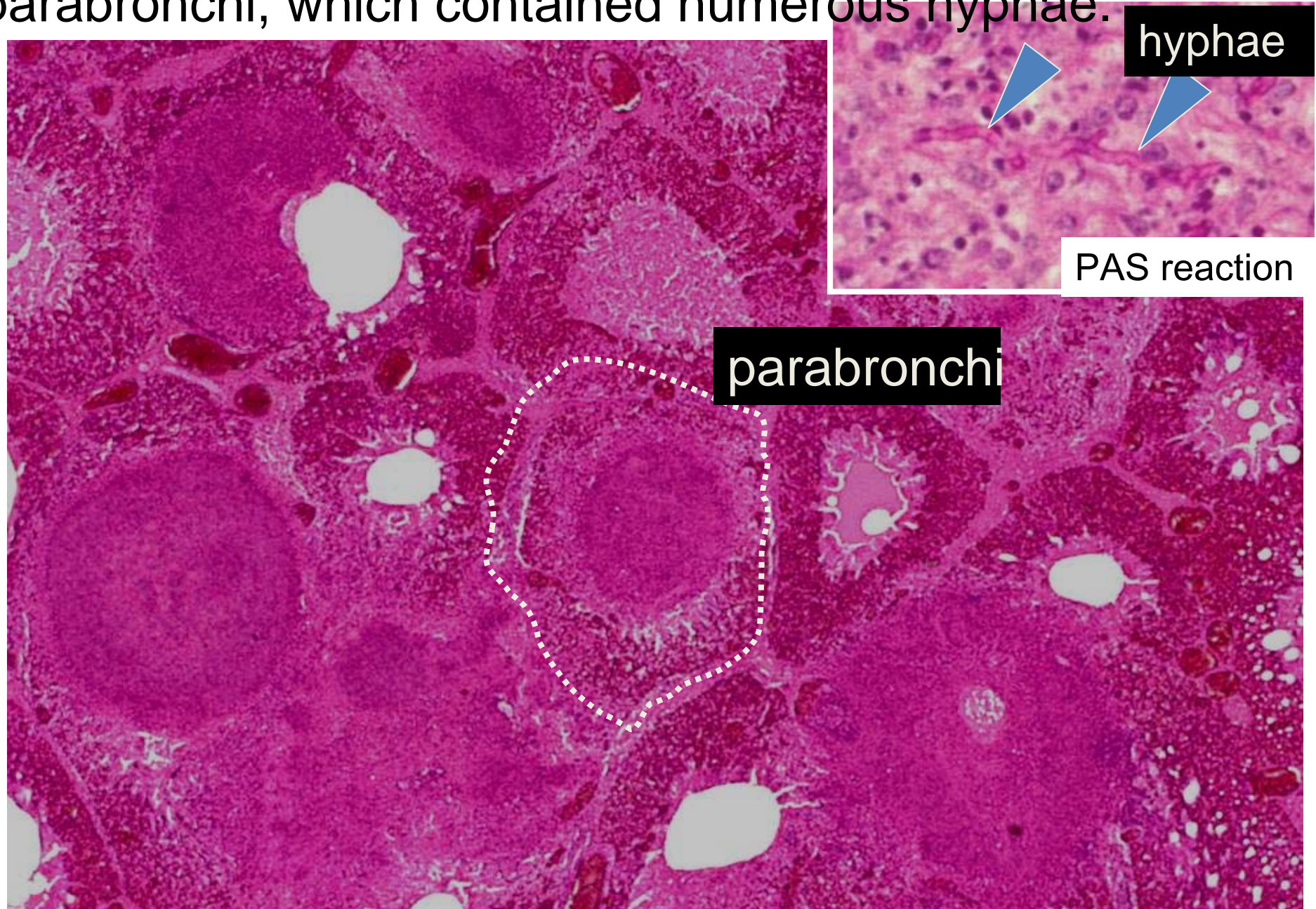
Necrosis of the epithelial cells

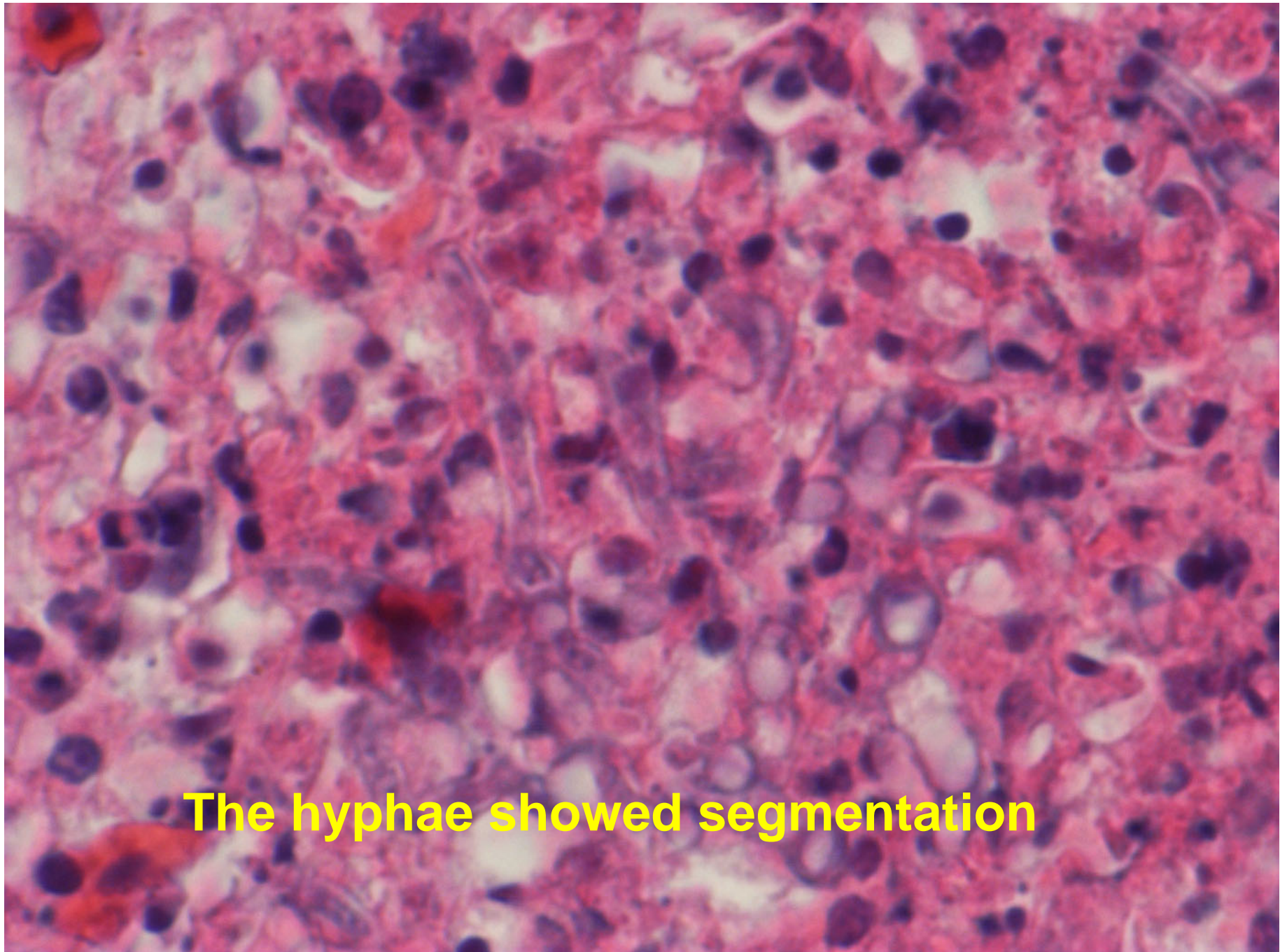


Conidial heads in lumen of the air sac. The arrangement of phialides and conidia is of *Aspergillus fumigatus*.



In the lung, there were multi-focal necrosis in the parabronchi, which contained numerous hyphae.





The hyphae showed segmentation

■ Histological features in Penguins

- Mycotic **air sacculitis**
- Multifocal-necrosis in the lung and larynx
- Peritonitis
- Pericarditis

■ Pathological diagnosis

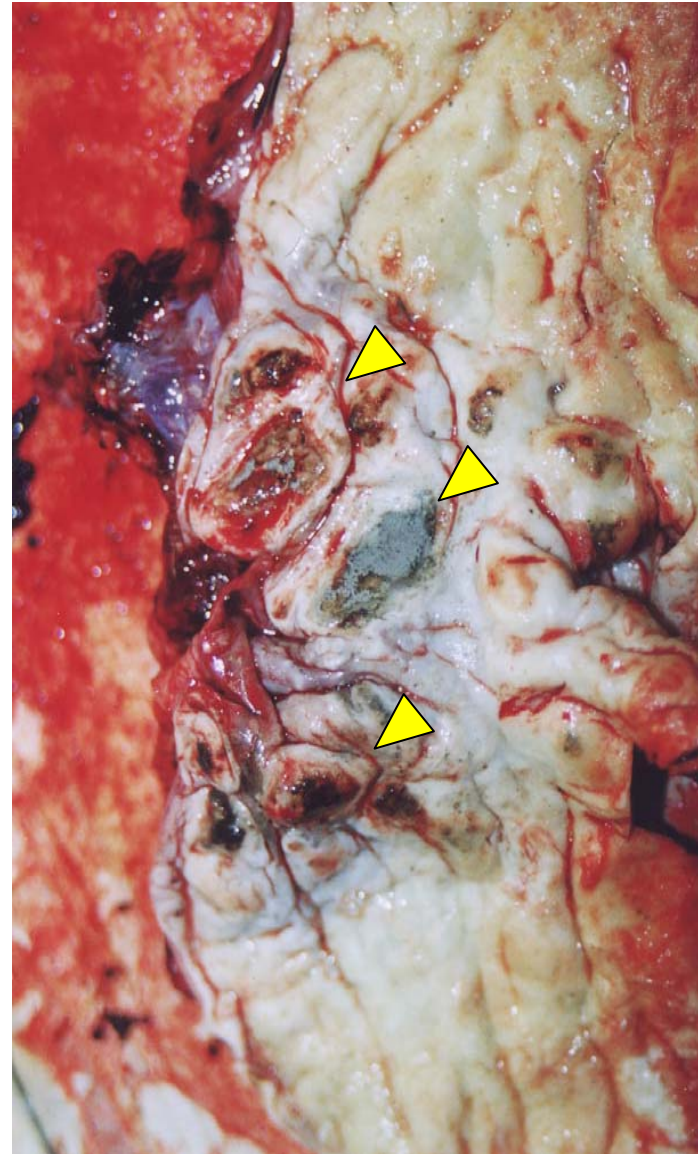
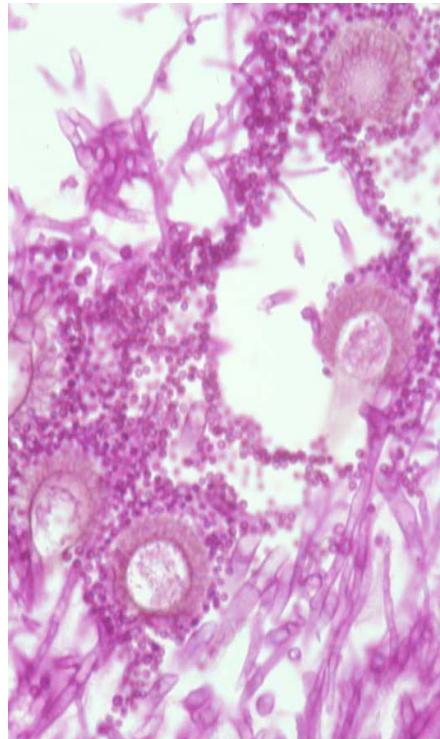
Aspergillosis based on morphology of **hyphae**

■ PCR

Aspergillus fumigatus (all cases)

Case 5 Humboldt penguin

Occasionally there were necrotic lesions with *aspergillus* spp. in the **mucosa of the gizzard**





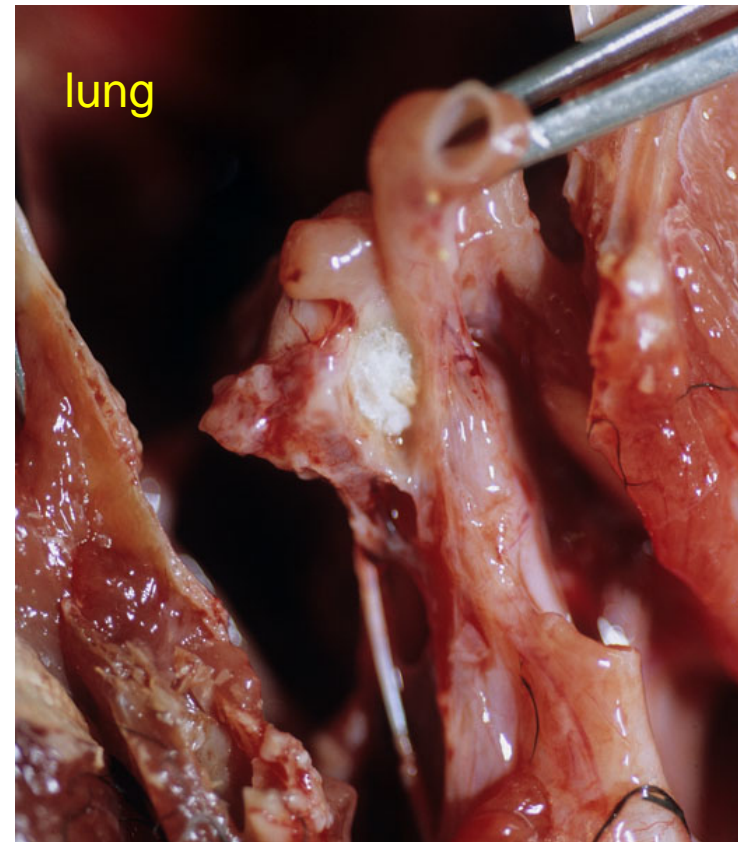
Nagoya
Aquarium HP

Recently some Japanese aquarium adopted barrier-system with HEPA-filtered air filtration and cold maintaining facility. These may be very effective to decrease aspergillosis in penguins.

Aspergillosis in pet birds

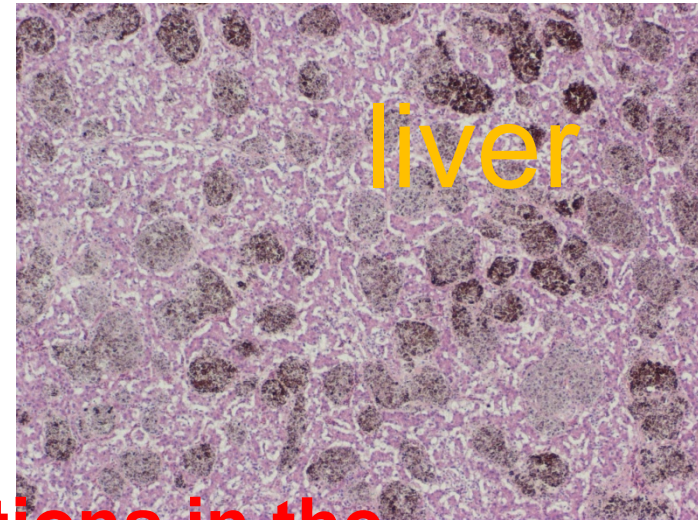
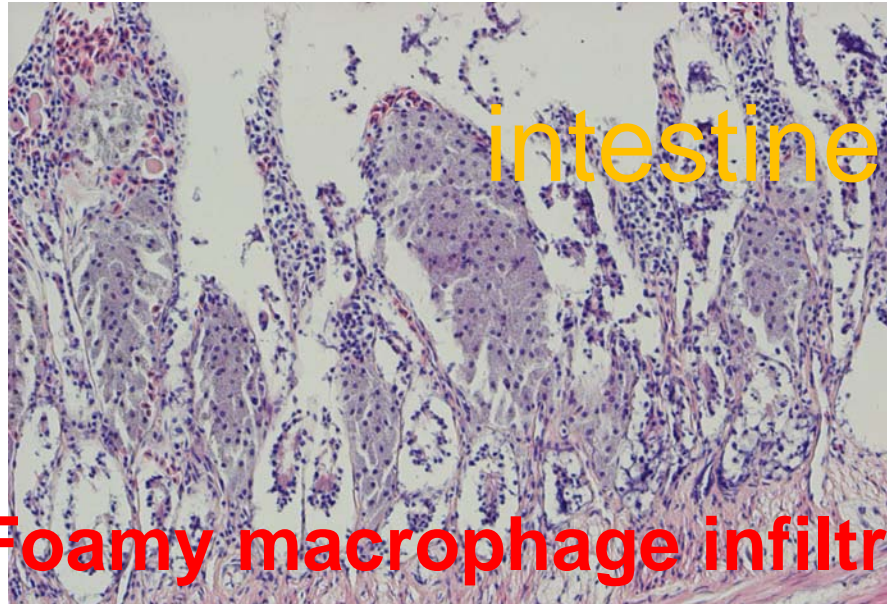
シロムネオオハシ

Red-billed Toucan :
Ramphastos tucanus.

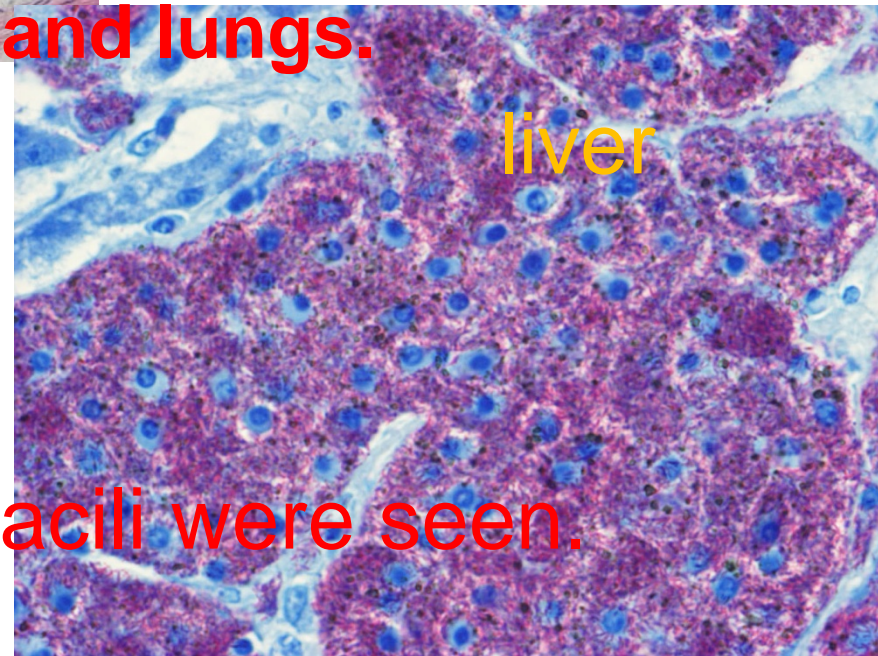
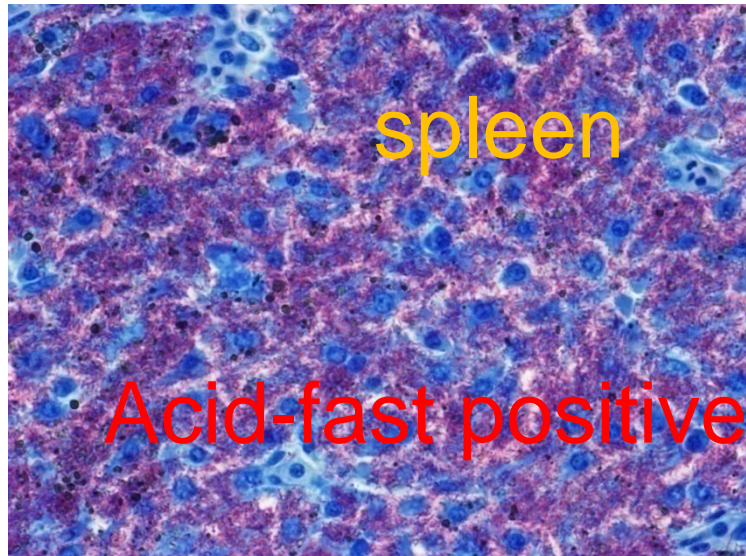


There was mycotic lesions in the lung, and the liver showed multifocal mottle.

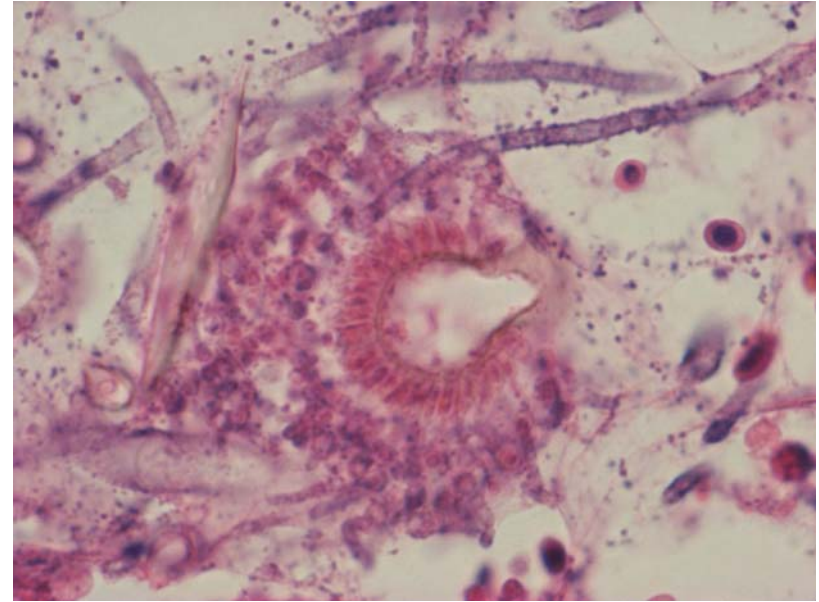
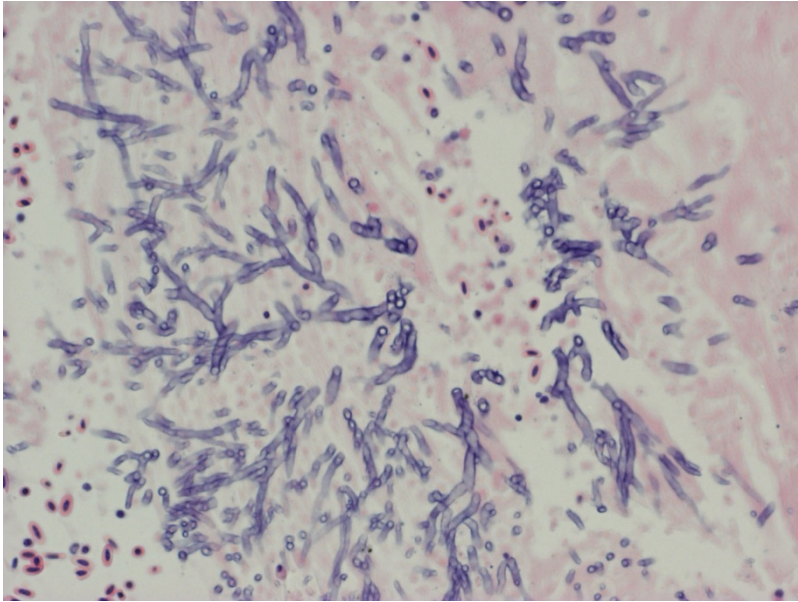
This case had disseminated mycobacteriosis.



Foamy macrophage infiltrations in the intestine , liver, spleen and lungs.



• Acid-fast positive bacilli were seen.



There are numerous hyphae radiated from a central necrotic nodule, forming microcolony (left).

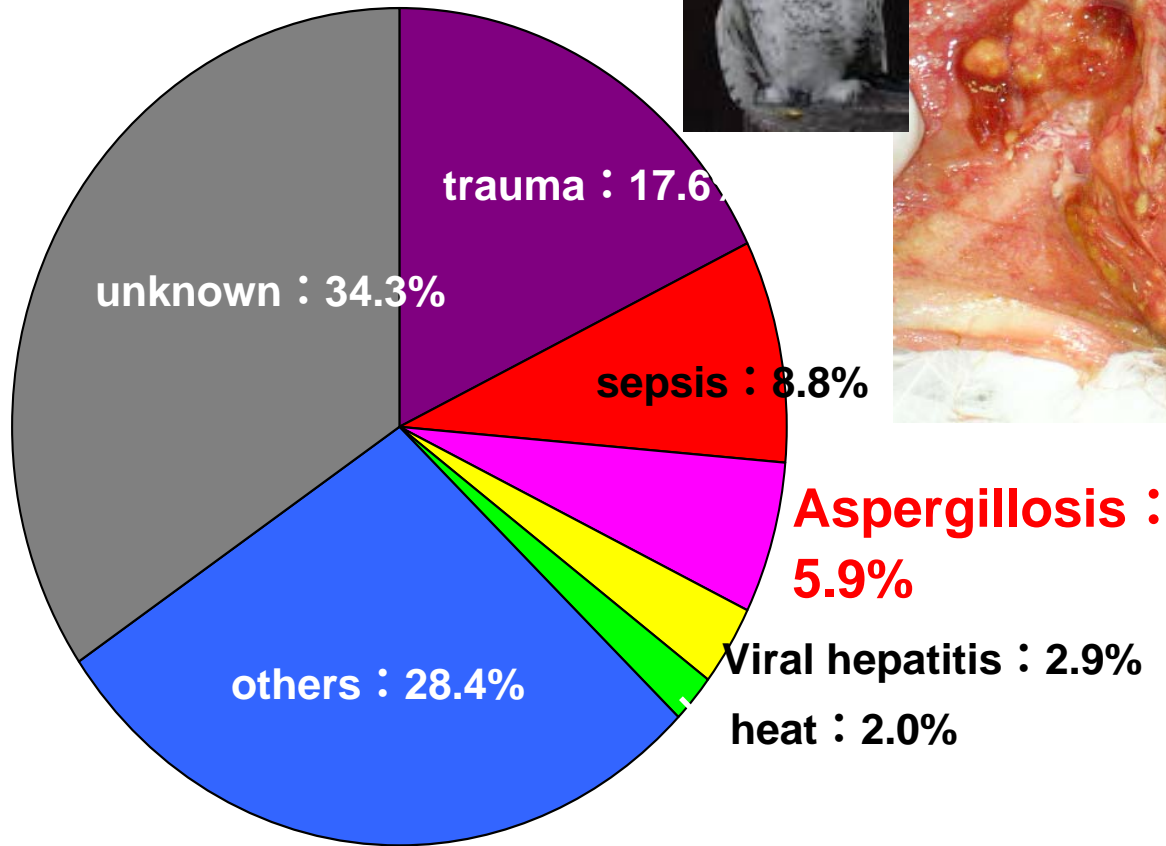
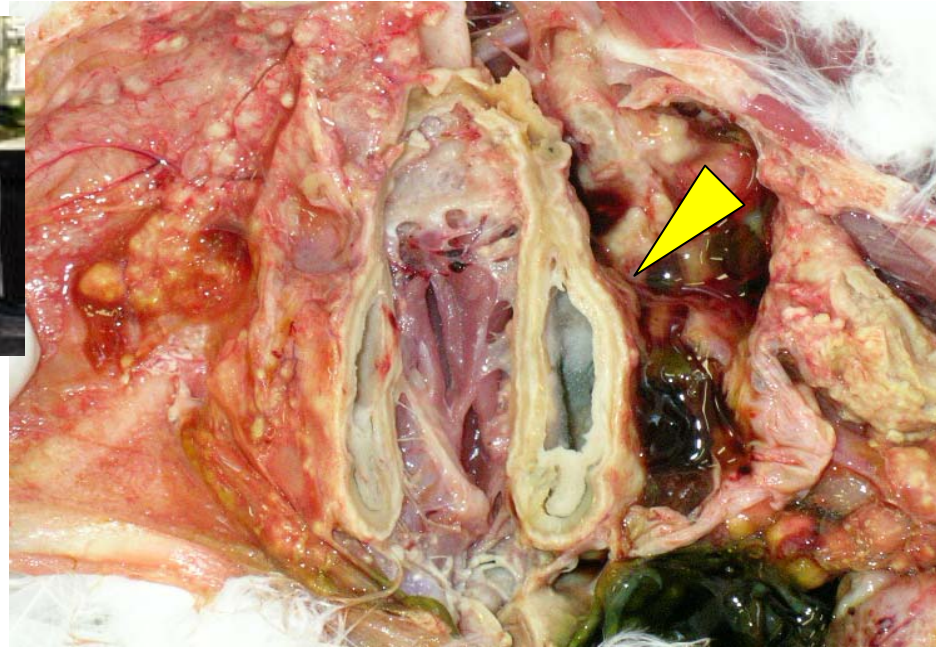
Conidial heads were observed in a pulmonary cavity (right).



Aspergillosis is frequently observed in raptors, birds of prey

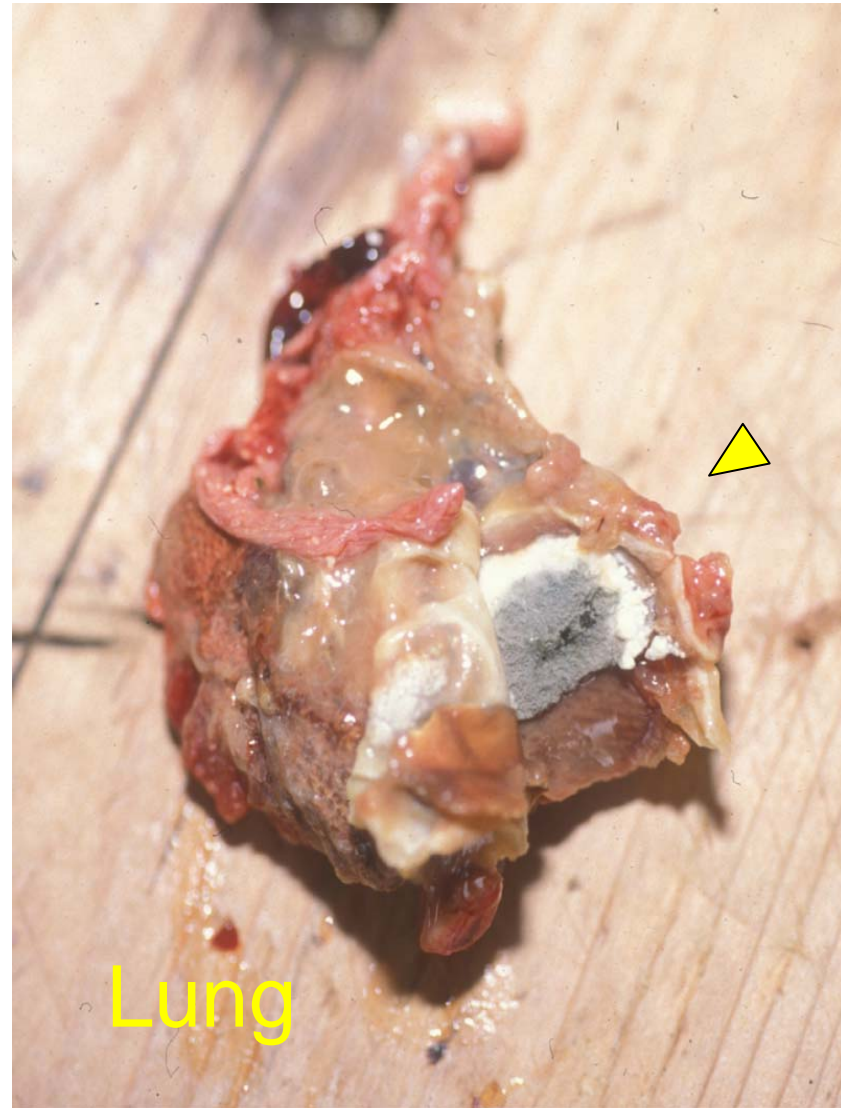
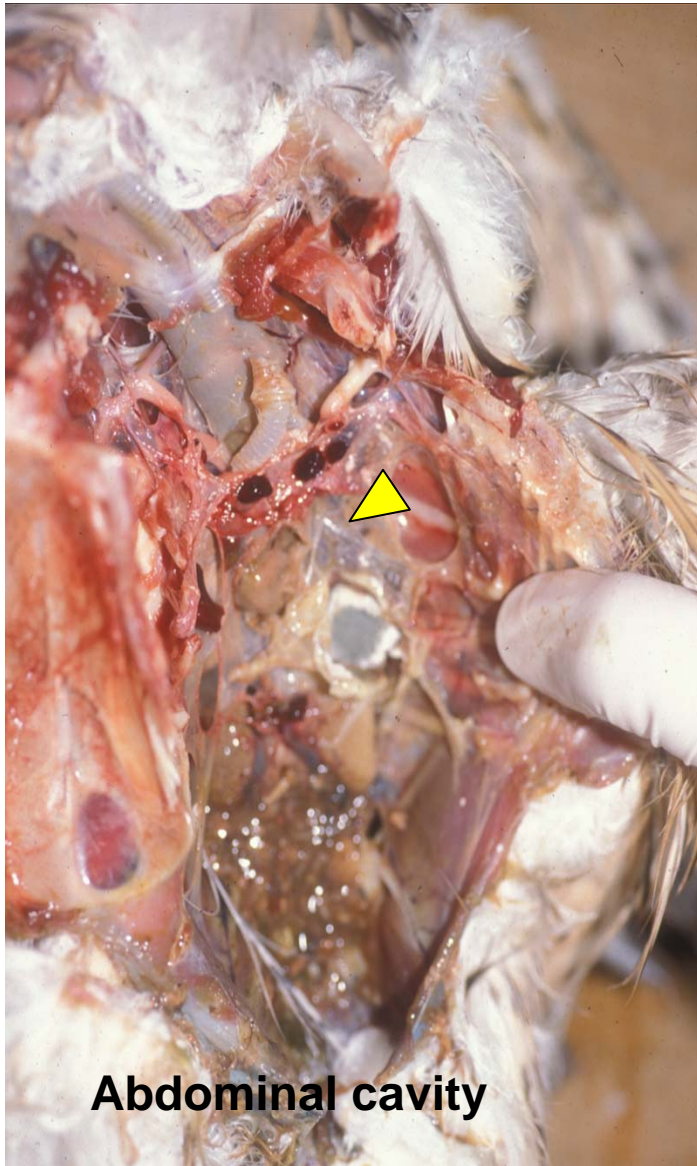


Aspergillosis was 5.9% in cause of death in 102 raptors



No. 172 Snowy Owl
(*Bubo scandiacus*)
Severely thickened air
sacs caused by
aspergillus spp. infection.
PCR:*Aspergillus
fumigatus*

Goshawk, *Accipiter gentilis*,

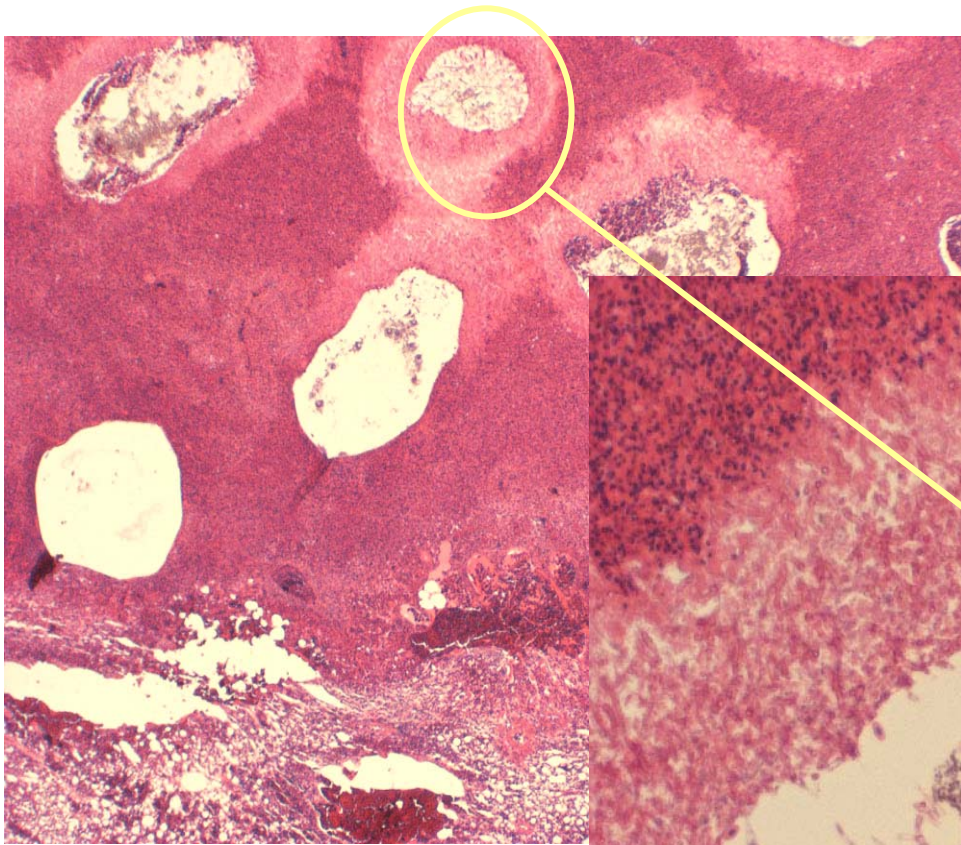


Gifu city is famous for cormorant fishing, which is a traditional fishing by using cormorants, *Phalacrocorax capillatus*. There were sporadic occurrence of *Aspergillosis* in retired cormorants.

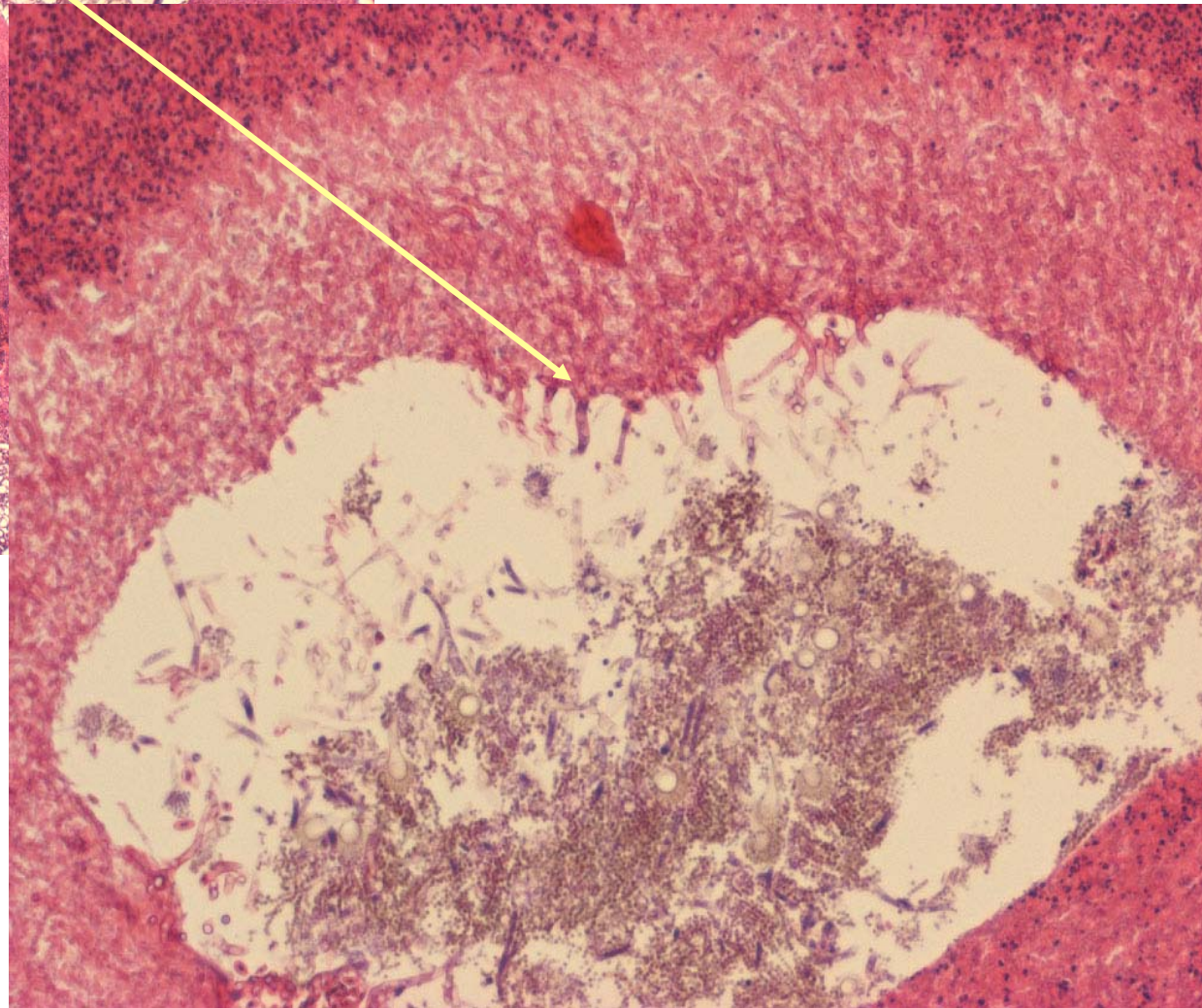


This fishing has 1300 years history.

HP from Gifu City



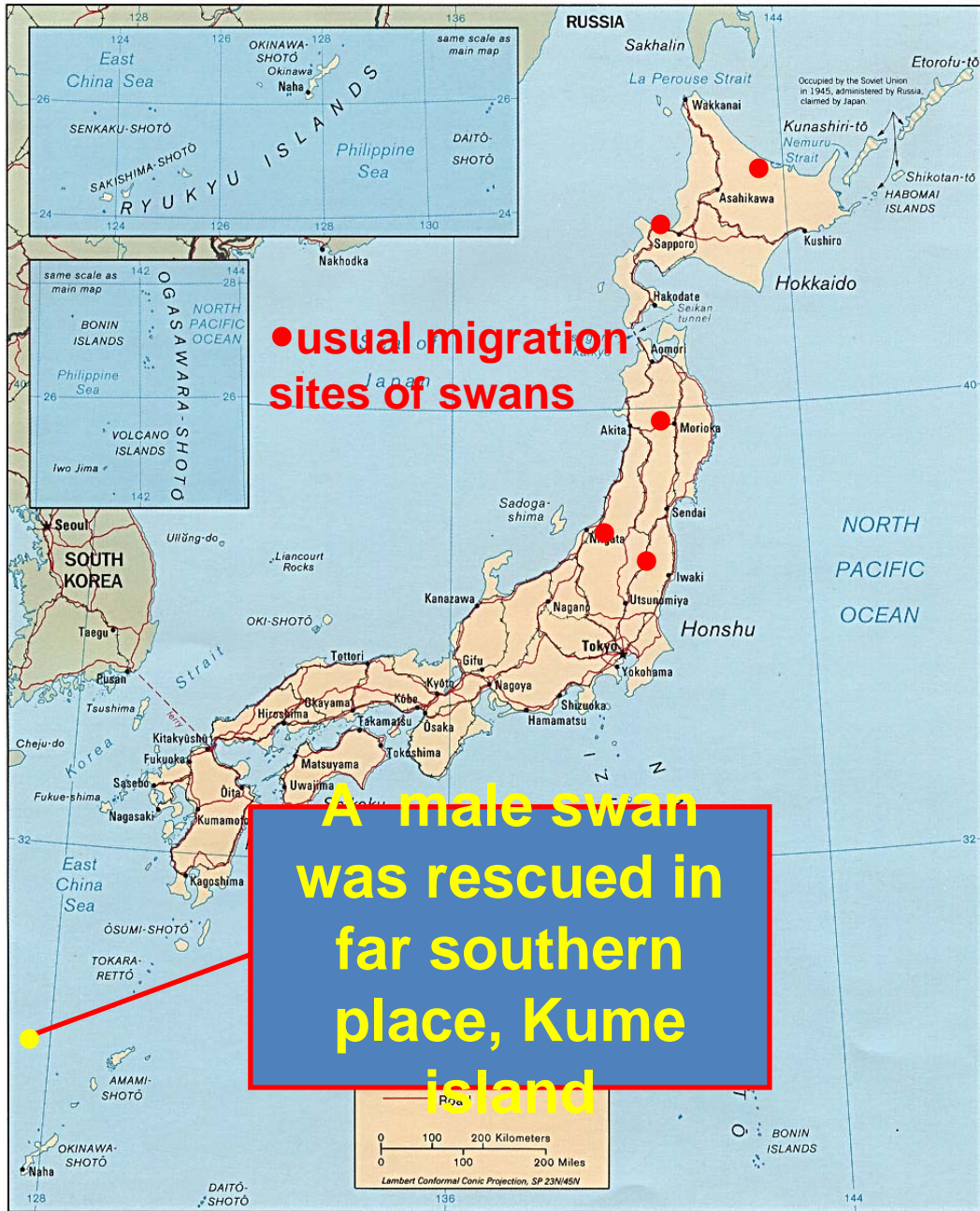
In the lung there were multi-focal necrosis with aspergillus phypae.



オオハクチョウ whooper swan (*Cygnus cygnus*)

Swans migrate from Siberia to Northern Japan in Winter.





• usual migration sites of swans

A male swan was rescued in far southern place, Kume island

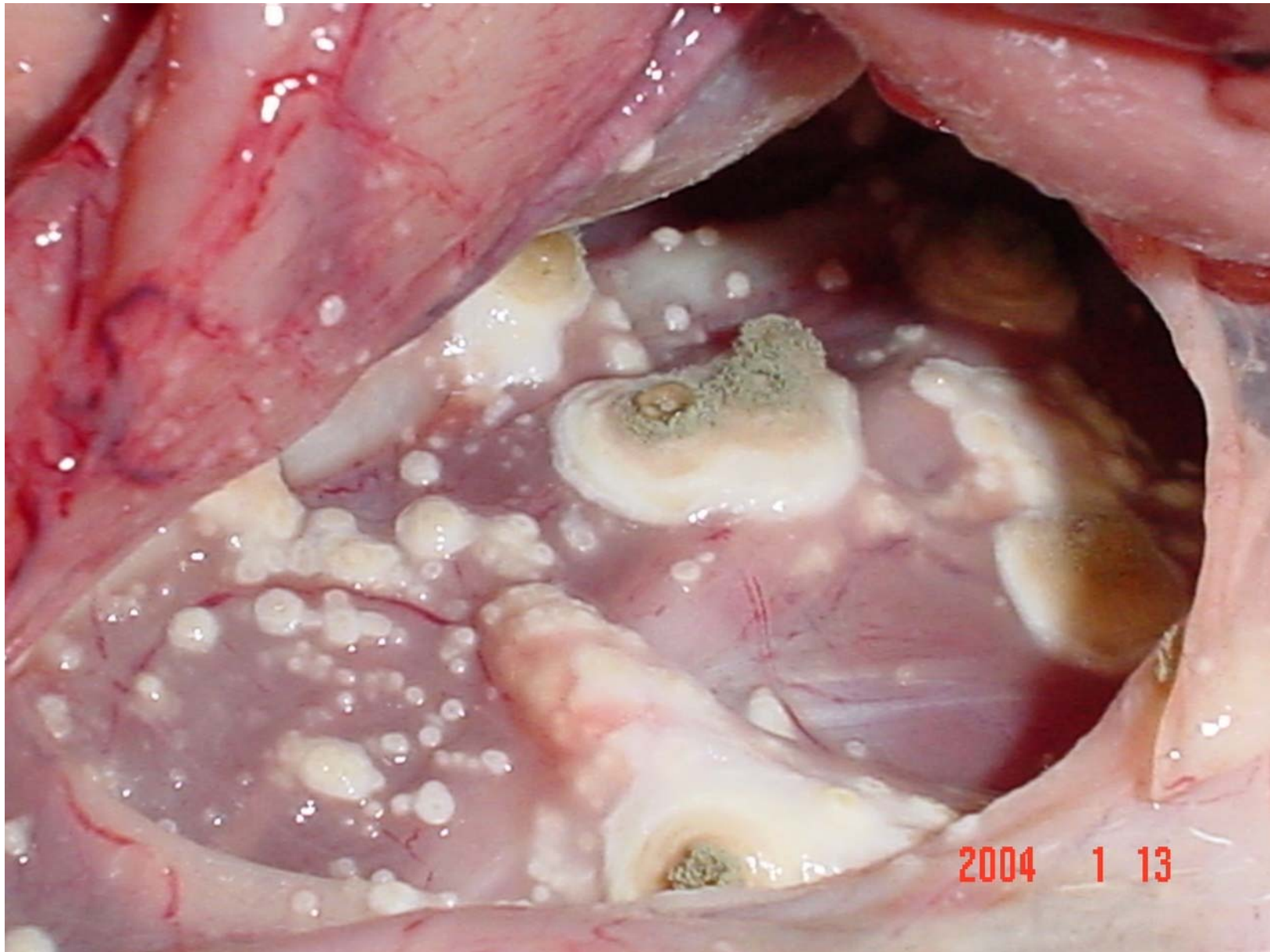


A male Whooper swan was rescued in unusual place, Kume island in Okinawa in poor health condition. He was attacked by crows.



Mycotic air sacculitis

Air sacs had multi-focal white nodules, with frequent fungi.





Larynx

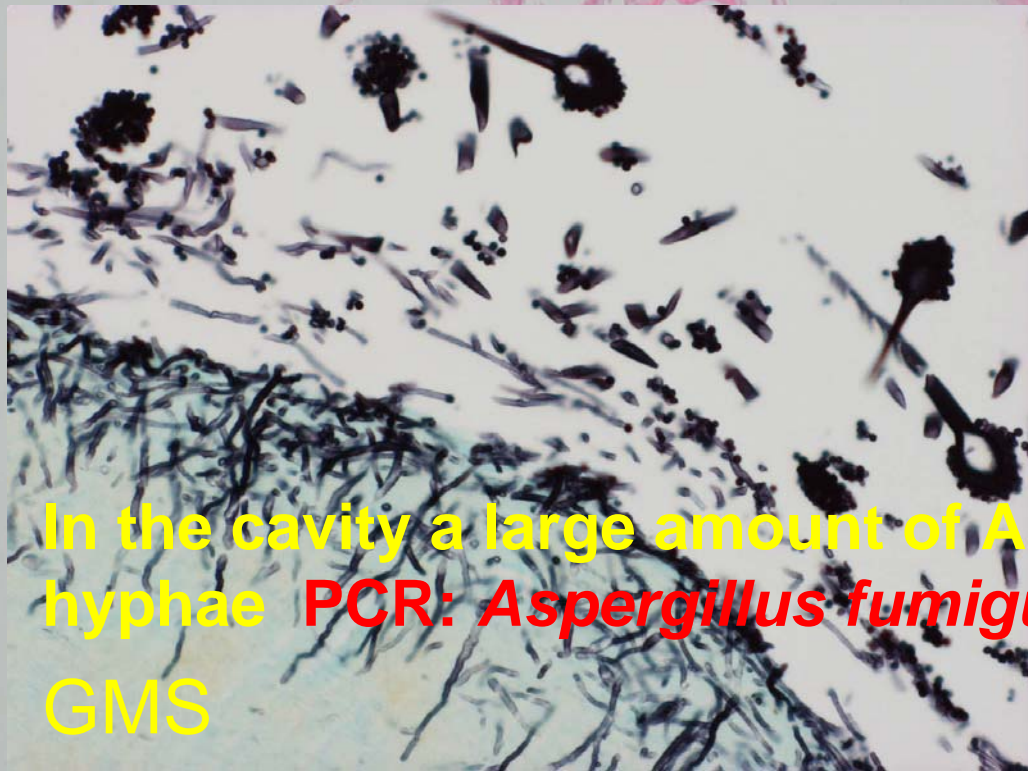
**The lungs and larynx
showed multiple mycotic
lesions**



The lung

2004 1 13

In the lung there were multi-focal necrosis with occasional cavities.



In the cavity a large amount of *Aspergillus* hyphae PCR: *Aspergillus fumigatus*

GMS

Aspergillosis in Japanese wild or captured birds

- Most of aspergillosis cases may be caused by *Aspergillus fumigatus*
- Penguins and raptors were major affected bird species
- Disease course was acute in most cases:

Thank you!
When inquiry, please
contact us.



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