Trouble in the tropics – How veterinary medicine informs conservation of terrestrial and marine wildlife in tropical island ecosystems

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1200s

1700s

% EXTINCT

1200s

Science 1982, 217:633-635
Reproduction

Immunity

Behavioral

Natives

Introduced
Regime shifts

Wildlife mortality as signal or precipitator of regime shifts.

Hysteresis

TIME
Agents of wildlife mortality

Infectious
- Viruses
- Fungi
- Parasites
- Bacteria

Non infectious
- Toxins/toxicants
- Trauma
- Physiologic
Indicator species?
Wildlife Disease Investigations

Field → Pathology

Infectious

Non-infect

Biodetection

Lab trials → Deductive

Cause
Fun with microscopy
(or why pathology is so cool)

Potential cause of death

Host response
(inflammation/necrosis)

Almost always

Occasionally

Potential cause of death

Host response
(inflammation/necrosis)
It's OK to say:

“I don’t know what killed it, but I do know what didn’t!”
Ahupua’a
Laysan duck

1000km

Laysan Island

Honolulu
Parasitic worm (Echinuria)
Translocation 2004

Midway

Laysan

Honolulu

Laysan duck
Translocation 2004

Release

Existing

New
Clostridium botulinum
Avian botulism — cause
Avian botulism management

Hazing

Carcass patrol

Water management
Translocation 2004

Release

Existing

New
Percent Species Diversity
The World’s Population in 2000, by Latitude

(horizontal axis shows the sum of all population at each degree of latitude)
Global climate change

Ocean acidification

Bleaching
Land use patterns
LOSS OF WETLANDS

PAST

LOSS OF ECOSYSTEMS IN THE LAST 230 YEARS

LOWLAND MESIC
94% lost

WETLANDS
85% lost

LOWLAND WET
32% lost

LOWLAND DRY
99% lost

PRESENT

The Nature Conservancy
Protecting nature. Preserving life.
Tripneustes gratilla (collector urchin)

Mortality Currents
Caribbean coral cover over time (Gardner et al. 2003)
INVASIVE ALGAE KANEHOHE
Kaneohe Bay

Release

Reef 44

Reef 27

Reef 29

Reef 28

500 m
Tissue response suggestive of infectious disease
Transmission electron microscope
PATHOLOGY

FIX & DECALCIFY

TRIM & EXAMINE
Probability of detection

Knowledge

USGS

science for a changing world
Veterinary Medicine Continuum

- Coral
- Free-ranging terrestrial wildlife
- Avian Exotic
- Equine Food
- Rodent Human
- Dog cat
Reduce overfishing
Stop dumping on reefs
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