

Avian Health: Diseases and Parasites of Michigan Birds

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Wildlife Disease Laboratory



The Wildlife Disease Laboratory

- Michigan Department of Natural Resources, Wildlife Division
- Located at Michigan State University Veterinary Diagnostic Laboratory
- Responsible for monitoring the health and well-being of MI Wildlife
 - Active surveillance – bovine tuberculosis (TB), chronic wasting disease (CWD)
 - Passive surveillance – public reports, necropsy program



Diagnostic testing

HISTOPATHOLOGICAL
EXAMINATION
(HISTO)



IMMUNOHISTOCHEMISTRY
(IHC)

POLYMERASE CHAIN
REACTION
(PCR)



NECROPSY/
GROSS LESIONS



BACTERIAL OR FUNGAL
CULTURE

TOXICOLOGY

OUTLINE

Bacteria

Viruses

Fungi

Parasites

Toxins

Trauma

Causative Agent

Species Affected

Transmission

Clinical Signs

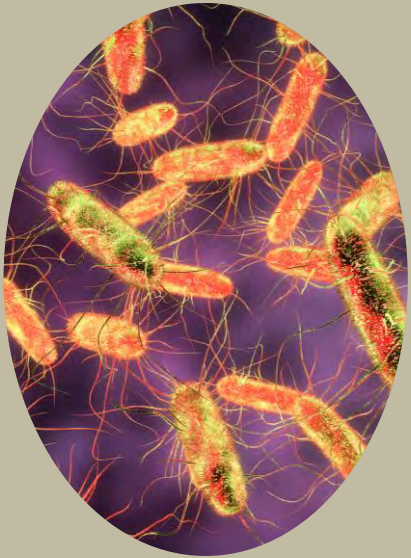
Diagnosis

The background features a light grey base with several overlapping organic shapes. A large, dark brown shape is on the left, partially overlapping a smaller, olive green shape on the right. In the top left, there are faint, stylized patterns of thin, radiating lines. A white, wavy line starts from the bottom left and curves across the lower right portion of the image.

Bacterial Diseases

Salmonellosis

CAUSATIVE AGENT



Salmonella enterica
sv. typhimurium

SPECIES AFFECTED



Wild and domestic birds,
mammals, insects,
reptiles, humans

TRANSMISSION



Shed in feces,
indirect contact

CLINICAL SIGNS



Ruffled feathers, weight
loss, incoordination,
tremors, accelerated
breathing

DIAGNOSIS



Gross lesions
Bacterial culture

TREATMENT & CONTROL: REMOVAL OF FEEDERS

Mycoplasmosis

CAUSATIVE AGENT



Mycoplasma
gallisepticum

SPECIES AFFECTED



Wild and domestic
birds

TRANSMISSION



Ocular discharge at
feeders or roosts

CLINICAL SIGNS



Crusty eyes, ocular
discharge, ruffled
feathers, weight loss,
inactivity

DIAGNOSIS

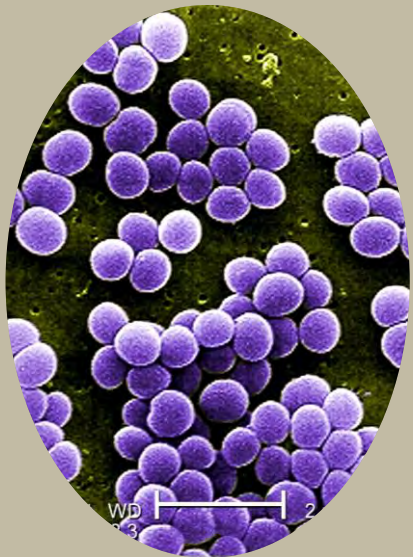


Gross lesions
Bacterial culture

TREATMENT & CONTROL: REMOVAL OF FEEDERS, REHAB OF INFECTED BIRDS PROHIBITED

Bumblefoot

CAUSATIVE AGENT



SPECIES AFFECTED



TRANSMISSION



CLINICAL SIGNS



DIAGNOSIS



Staphylococcus sp.

Wild and domestic birds

Trauma allowing introduction of bacteria

Difficulty walking or standing, swollen feet, malnutrition

Gross lesions
Histo

TREATMENT & CONTROL: NONE

Botulism: Types C and E

CAUSATIVE AGENT



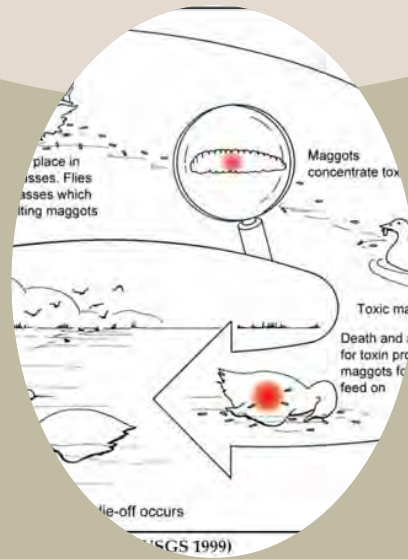
Clostridium botulinum

SPECIES AFFECTED



Type C : Dabbling ducks
Type E : Fish eating birds, scavengers

TRANSMISSION



Conditions favoring bacterial growth and toxic production

CLINICAL SIGNS



Limberneck, muscular paralysis

DIAGNOSIS

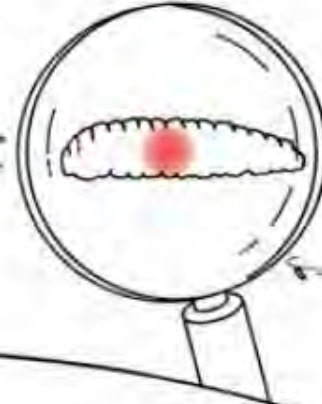


Mouse bioassay

60 – 92 °F



Toxin production takes place in decaying animal carcasses. Flies deposit eggs on carcasses which are fed upon by resulting maggots

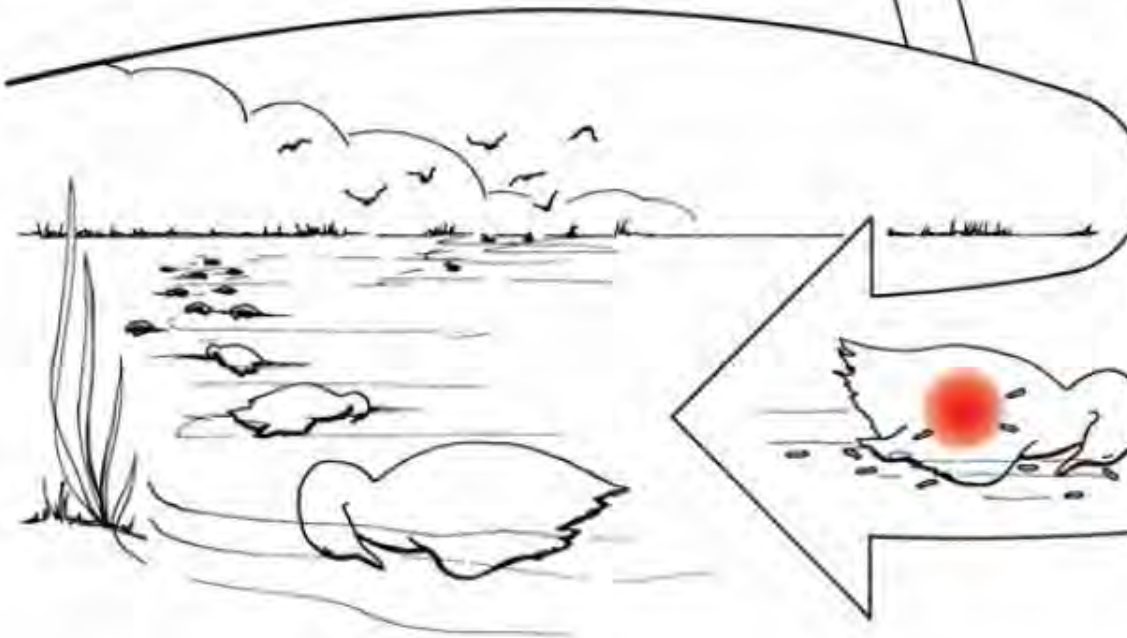


Maggots concentrate toxin



Toxic maggots are ingested

Death and additional carcasses for toxin production and toxic maggots for other birds to feed on



Cycle accelerates — major die-off occurs

Figure 4. Carcass-maggot cycle of avian botulism (USGS 1999)

Botulism: Types C and E

CAUSATIVE AGENT



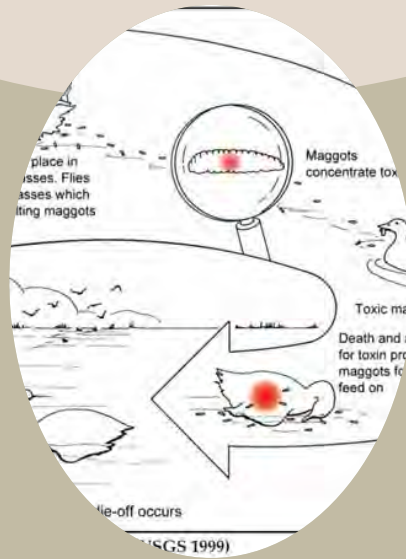
Clostridium botulinum

SPECIES AFFECTED



Type C : Dabbling ducks
Type E : Fish eating birds, scavengers

TRANSMISSION



Conditions favoring bacterial growth and toxic production

CLINICAL SIGNS



Limberneck, muscular paralysis

DIAGNOSIS



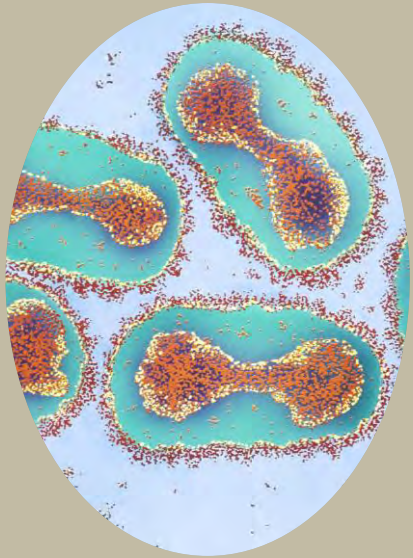
Mouse bioassay

The background features a light grey base with several overlapping organic shapes. A large, dark brown shape is on the left, and a large, olive green shape is on the right. A white, wavy line curves across the bottom right. In the top left, there is a faint, grey silhouette of a palm tree.

Viral Diseases

Avian Pox

CAUSATIVE AGENT



Avipoxvirus

SPECIES AFFECTED



Wild and domestic birds

TRANSMISSION



Direct or indirect contact, mosquito vector

CLINICAL SIGNS



Dark warty growths,
Cutaneous form
Diphtheretic form

DIAGNOSIS

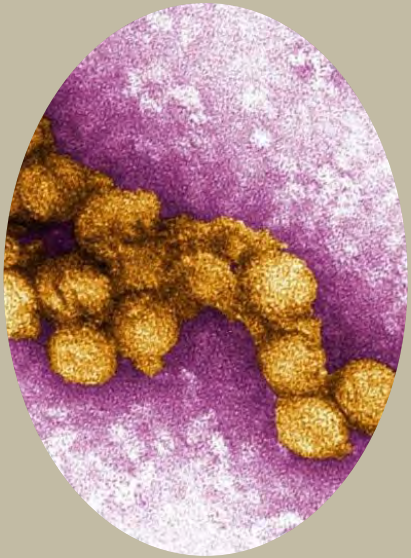


Gross lesions
Histo

TREATMENT & CONTROL: REMOVAL OF INFECTED BIRDS

West Nile Virus

CAUSATIVE AGENT



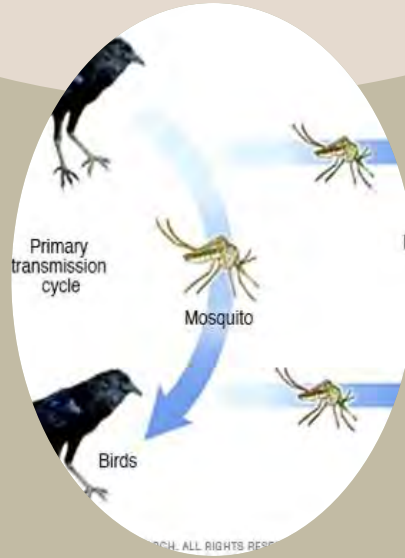
Flavivirus

SPECIES AFFECTED



Wild and domestic birds, mammals, humans

TRANSMISSION



Mosquito vector

CLINICAL SIGNS

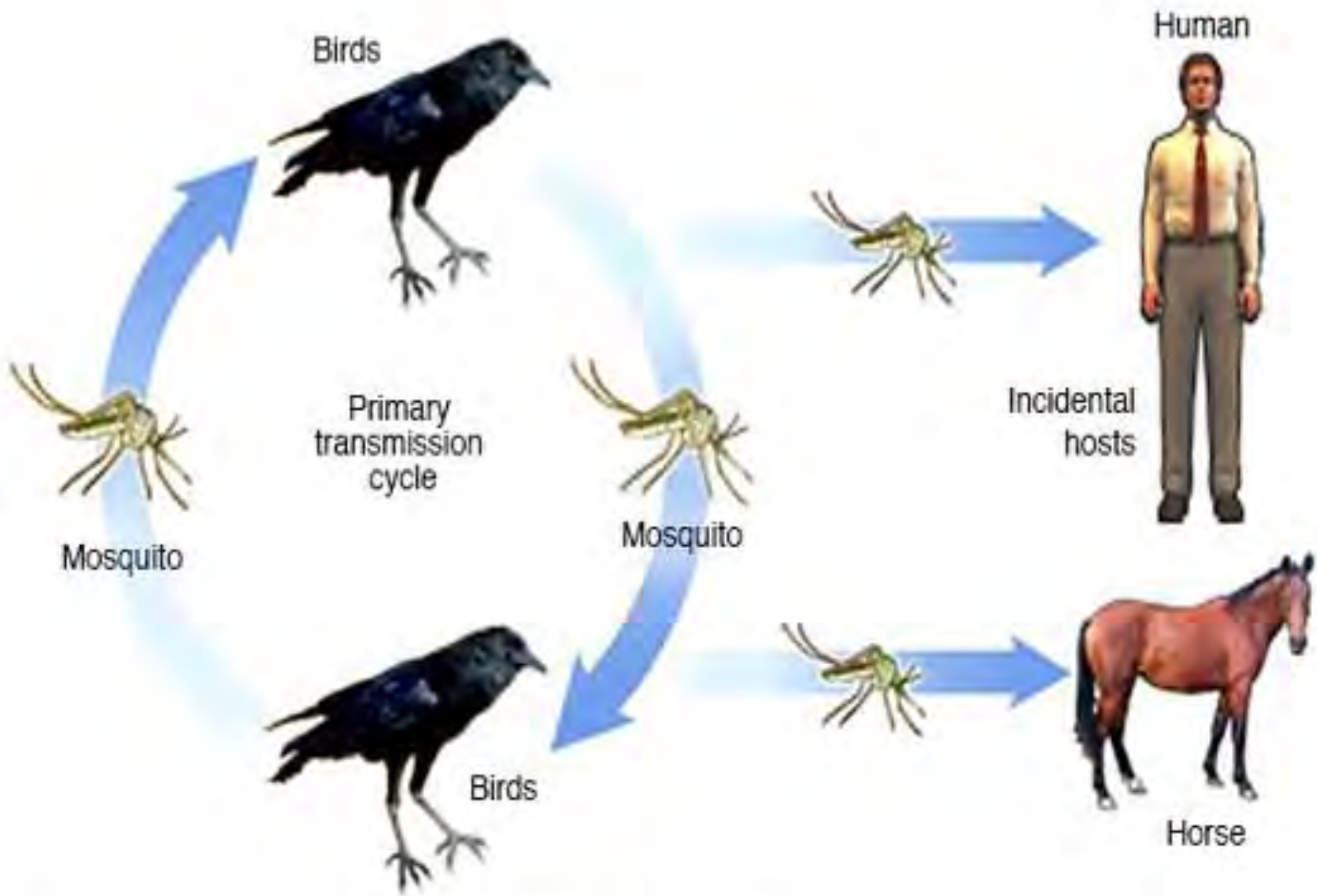


Uncoordinated walking or flying, lethargy, head tilt, tremors

DIAGNOSIS

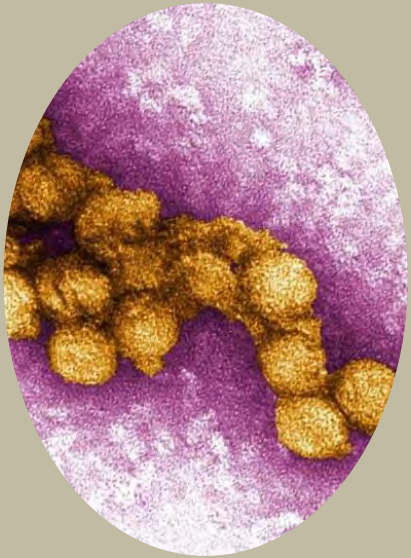


PCR blood feathers or tissues



West Nile Virus

CAUSATIVE AGENT



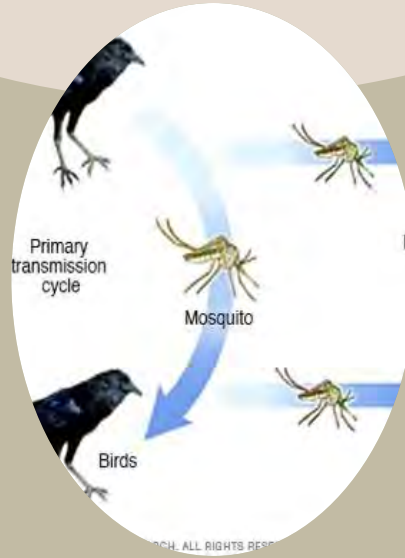
Flavivirus

SPECIES AFFECTED



Wild and domestic birds, mammals, humans

TRANSMISSION



Mosquito vector

CLINICAL SIGNS



Uncoordinated walking or flying, lethargy, head tilt, tremors

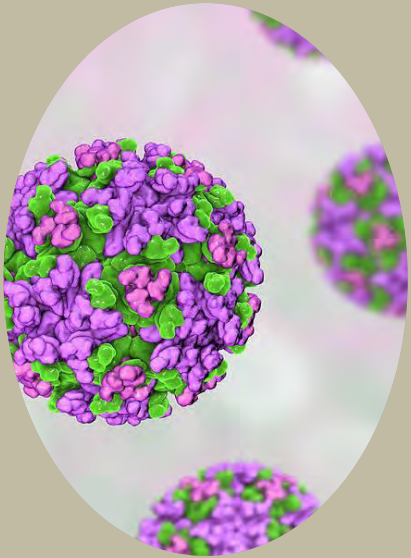
DIAGNOSIS



PCR blood feathers or tissues

Eastern Equine Encephalitis Virus

CAUSATIVE AGENT



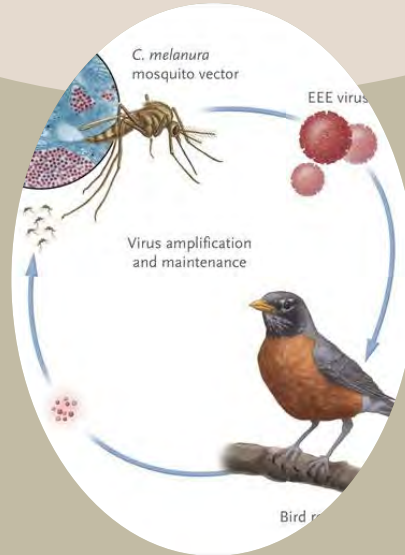
Togavirus

SPECIES AFFECTED



Wild and domestic birds, mammals, humans

TRANSMISSION



Mosquito vector

CLINICAL SIGNS



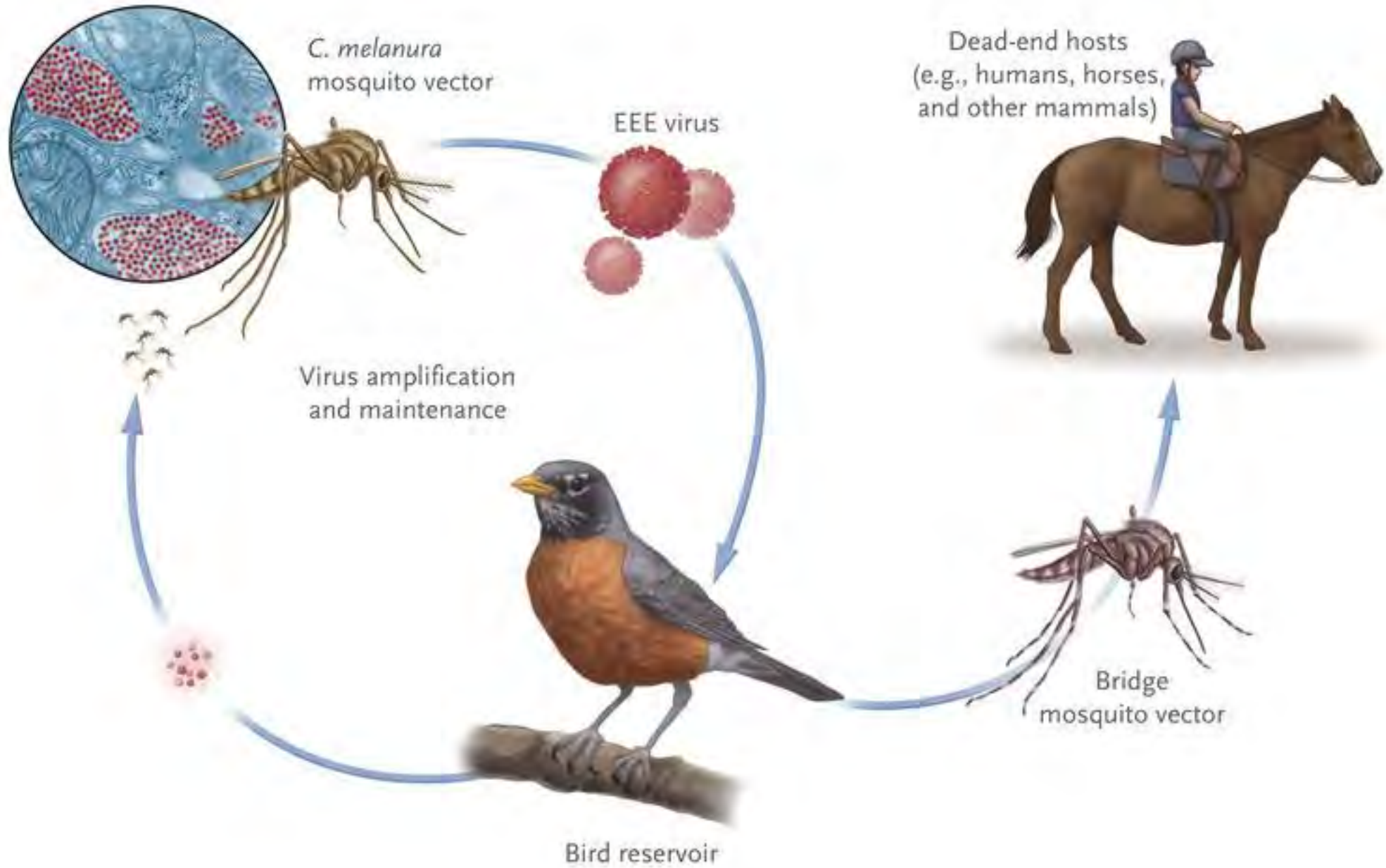
Uncoordinated walking or flying, lethargy, head tilt, tremors

DIAGNOSIS



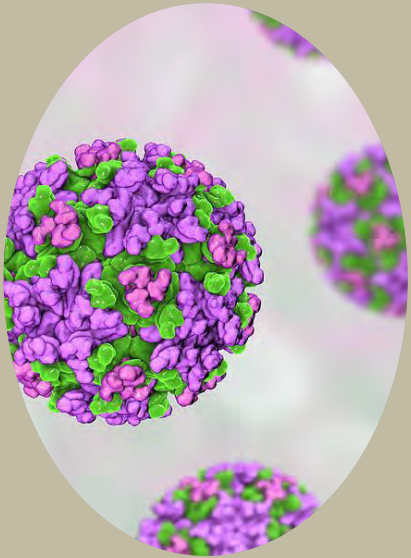
PCR tissues
Histo

TREATMENT & CONTROL: MOSQUITO CONTROL



Eastern Equine Encephalitis Virus

CAUSATIVE AGENT



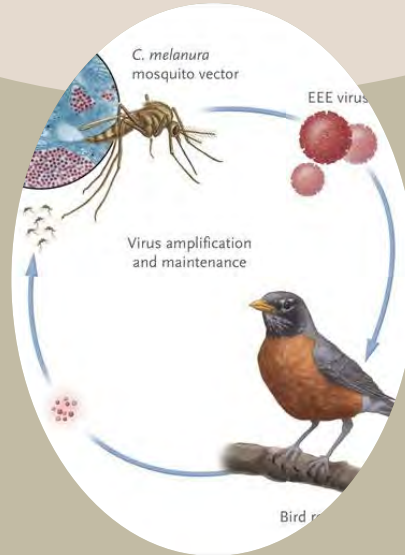
Togavirus

SPECIES AFFECTED



Wild and domestic birds, mammals, humans

TRANSMISSION



Mosquito vector

CLINICAL SIGNS



Uncoordinated walking or flying, lethargy, head tilt, tremors

DIAGNOSIS

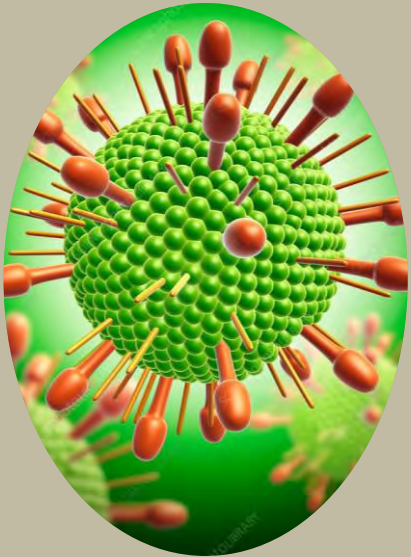


PCR tissues
Histo

TREATMENT & CONTROL: MOSQUITO CONTROL

New Castle Disease

CAUSATIVE AGENT



Avian paramyxovirus

SPECIES AFFECTED



Wild and domestic birds

TRANSMISSION



Inhalation of viral particles from contaminated food and/or water

CLINICAL SIGNS



Uncoordinated walking or flying, tremors, wing or leg paralysis

DIAGNOSIS

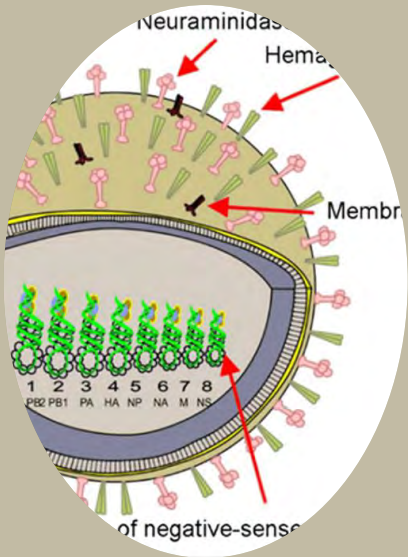


Virus isolation

TREATMENT & CONTROL: None

Avian Influenza Virus

CAUSATIVE AGENT



Type A Influenza
Combinations of H's
and N's

SPECIES AFFECTED



Wild and domestic
birds, mammals,
humans

TRANSMISSION



Shed in feces, mucous, saliva
Direct or indirect contact

CLINICAL SIGNS



Sudden death,
lethargy, blindness,
respiratory distress

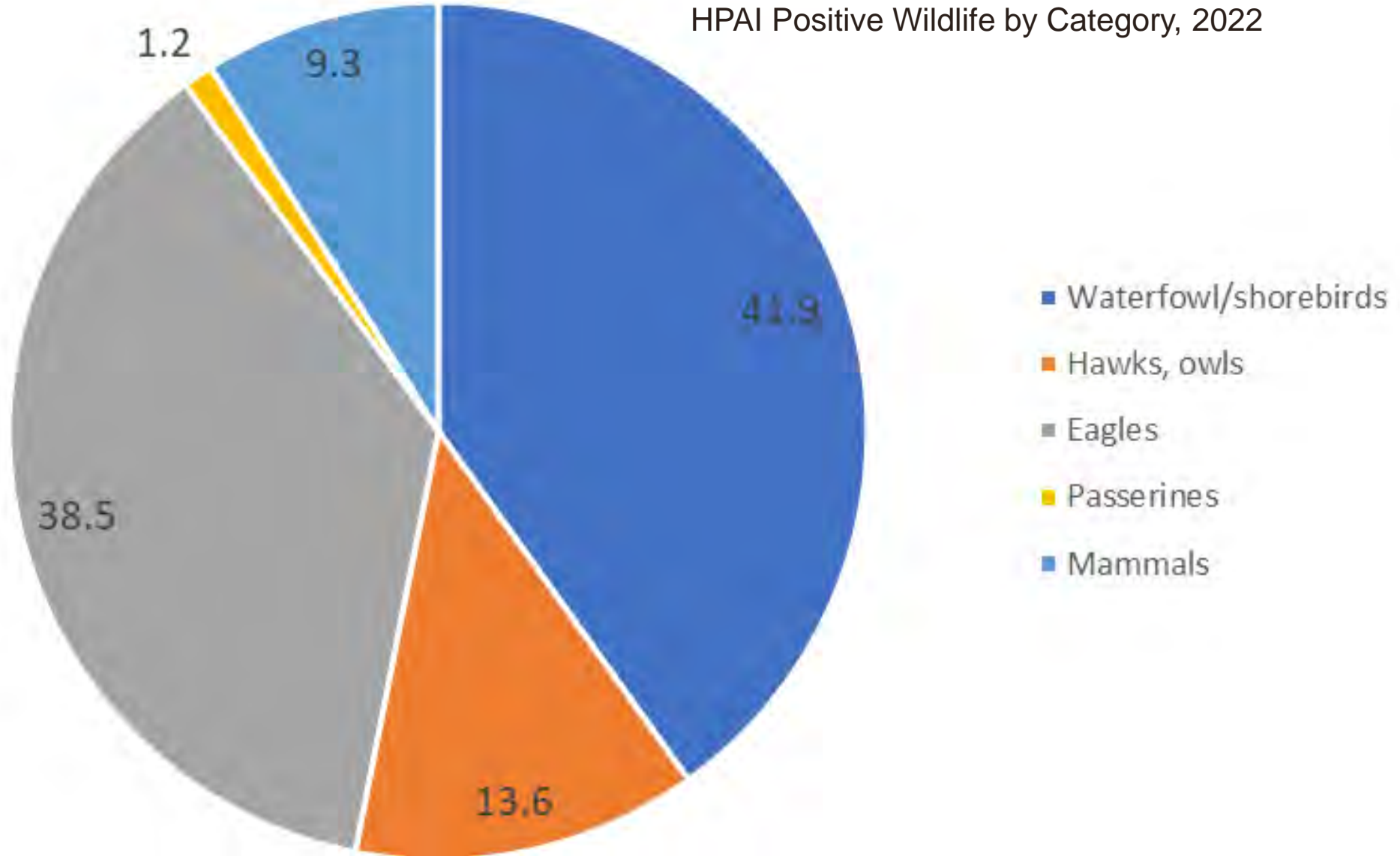
DIAGNOSIS



PCR
Virus Isolation

TREATMENT & CONTROL: None, removal of carcass to prevent scavenging

HPAI Positive Wildlife by Category, 2022



Species	# Confirmed H5N1 Positive	Species	# Confirmed H5N1 Positive
Eagle, Bald	61	Coyote	1
Goose, Canada	23	Crow, American	1
Fox, Red	11	Duck, Mallard x Domestic	1
Hawk, Red-tailed	8	Duck, Redhead	1
Gull, Herring	7	Falcon, Peregrine	1
Owl, Snowy	5	Fox, Gray	1
Redhead	5	Gadwall	1
Duck, Ring-necked	4	Hawk, Red-shouldered	1
Cormorant, Double Crested	3	Hawk, Rough-legged	1
Duck, Wood	3	Heron, Great Blue	1
Mallard	3	Loon, Common	1
Merganser, Hooded	3	Owl, Great Horned	1
Swan, Tundra	3	Owl, Barred	1
Crane, Sandhill	2	Pelican, White	1
Owl, Great Horned	2	Raccoon	1
Swan, Black	2	Swan, Mute	1
Swan, Trumpeter	2	Tern, Caspian	1
Wood duck	2	Wigeon, American	1
Blackbird, Red-winged	1		

Bald Eagles and HPAI

- 125 tested
 - 61 confirmed positive, 4 probable
- Most found dead, many adults (70%)
- Long term implication on eagle populations?
- Implications on reproductive success?



The background features a light grey base with several overlapping organic shapes. A large, dark brown shape is on the left, and a large, olive green shape is on the top right. In the top left corner, there are stylized, grey, fern-like patterns. A white, wavy line starts from the bottom left and curves across the bottom right.

Fungal Diseases

Aspergillosis

CAUSATIVE AGENT



Aspergillus fumigatus

SPECIES AFFECTED



Wild and domestic birds, mammals, humans

TRANSMISSION



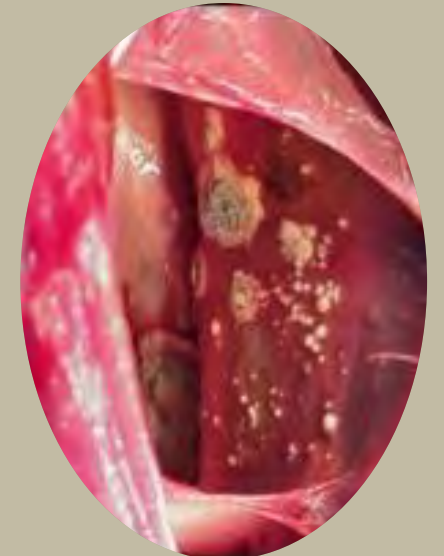
Inhalation of fungal spores

CLINICAL SIGNS



Respiratory distress, malnutrition

DIAGNOSIS



Gross lesions
Histo
Fungal culture

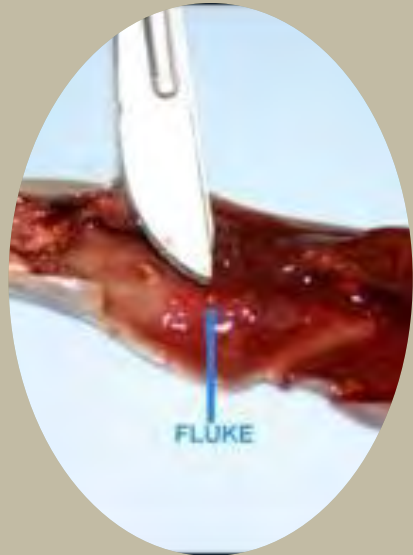
TREATMENT & CONTROL: Removal of moldy feed or bedding, keep feed dry and protected, keep feeders clean and dry

The background features a light grey base with several overlapping organic shapes. A large, dark brown shape is on the left, and a large, olive green shape is on the right. A white, wavy line starts from the bottom left and curves across the bottom right. In the top left corner, there are faint, stylized leaf patterns in shades of grey and brown.

Parasites

Verminous Hemorrhagic Ulcerative Enteritis

CAUSATIVE AGENT



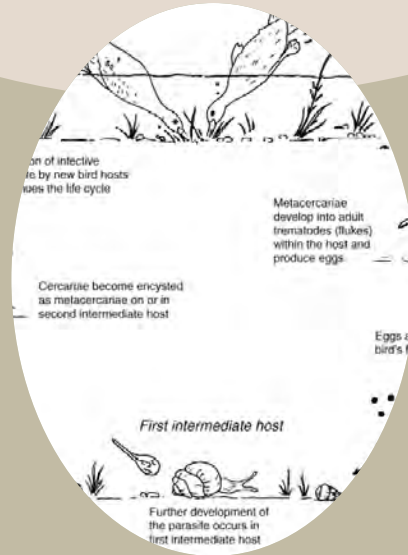
Sphaeridiotrema globulus

SPECIES AFFECTED



Wild and domestic waterfowl

TRANSMISSION



Complex life cycle, ingestion of snail containing parasite

CLINICAL SIGNS

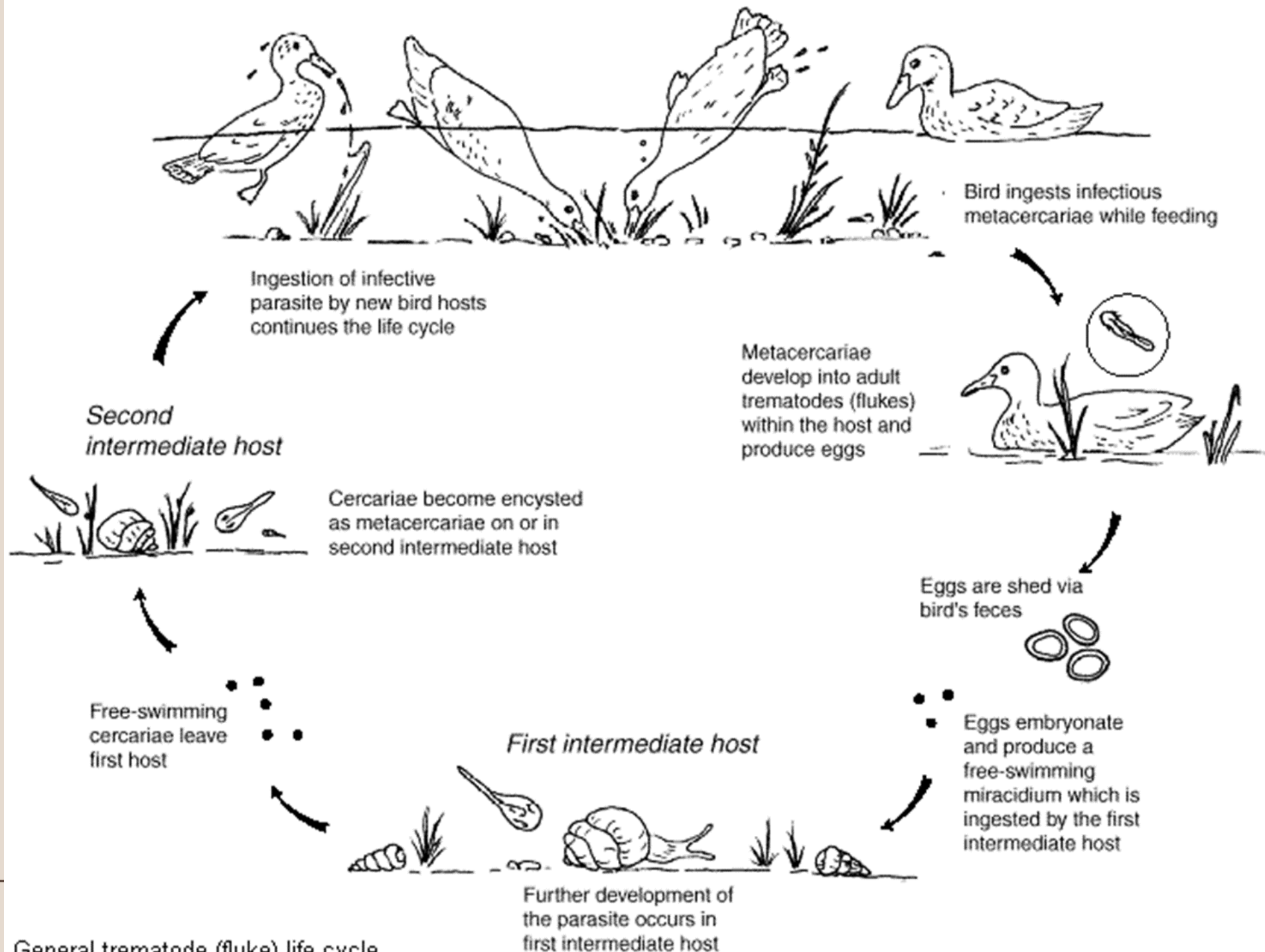


Weakness, wing droop, limberneck, sudden mortality

DIAGNOSIS



Gross lesions
Parasite ID



General trematode (flake) life cycle

Verminous Hemorrhagic Ulcerative Enteritis

CAUSATIVE AGENT



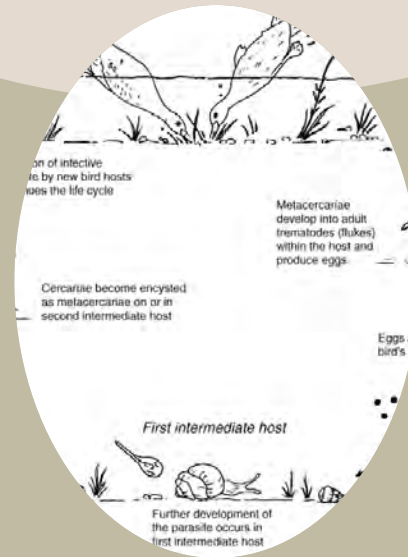
Sphaeridiotrema globulus

SPECIES AFFECTED



Wild and domestic waterfowl

TRANSMISSION



Complex life cycle, ingestion of snail containing parasite

CLINICAL SIGNS



Weakness, wing droop, limberneck, sudden mortality

DIAGNOSIS



Gross lesions
Parasite ID

Histomoniasis

CAUSATIVE AGENT



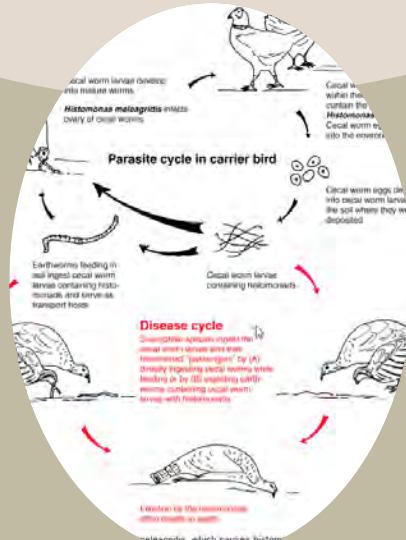
Histomonas
meleagridis

SPECIES AFFECTED



Turkey, quail, grouse,
domestic poultry

TRANSMISSION



Complex life cycle, ingestion
of snail containing parasite

CLINICAL SIGNS

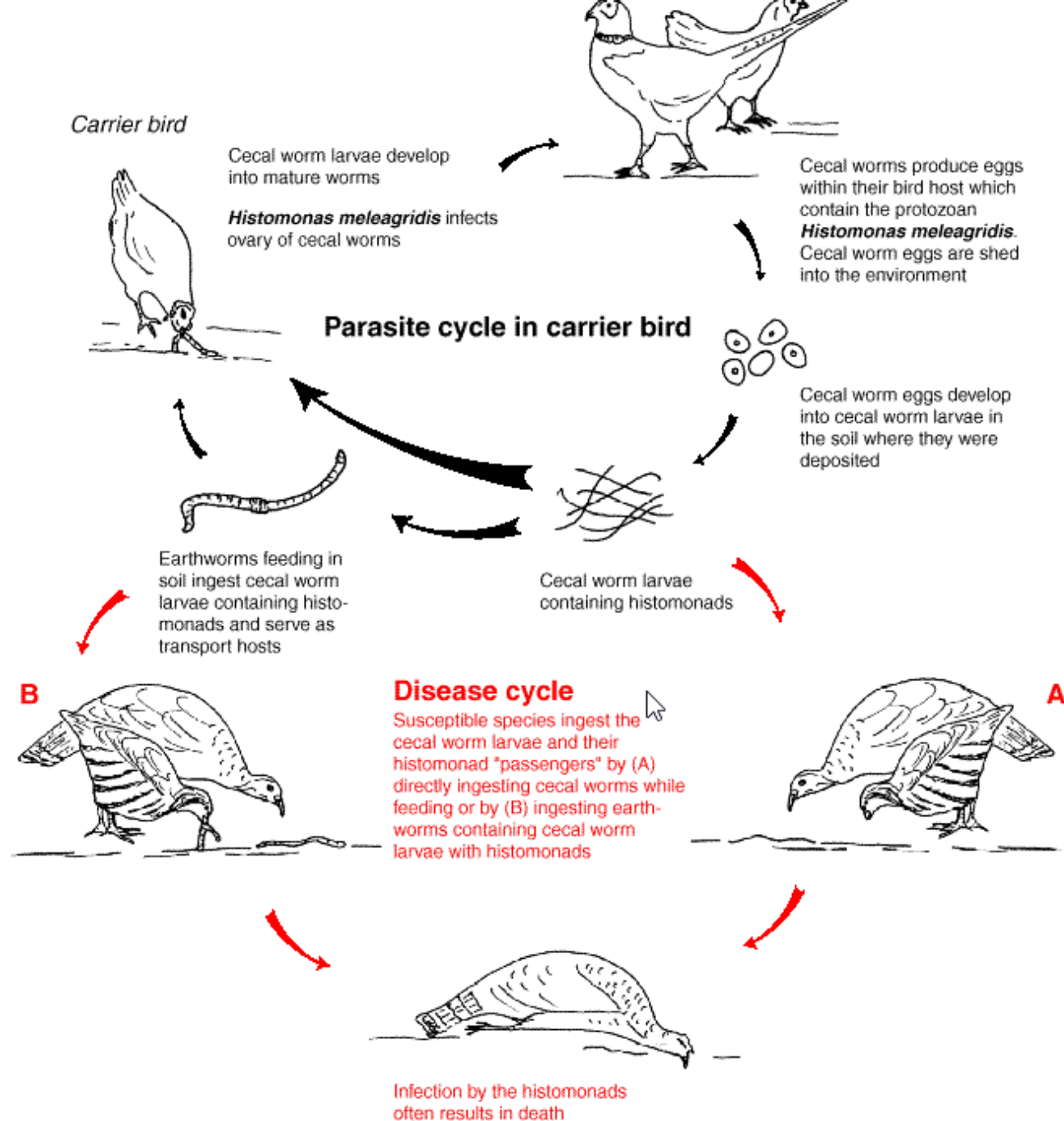


Head tilt, ruffled
feathers, wing droop

DIAGNOSIS



Gross lesions
Histo



Life cycle of the protozoon *Histomonas meleagridis*, which causes histomoniasis

Histomoniasis

CAUSATIVE AGENT



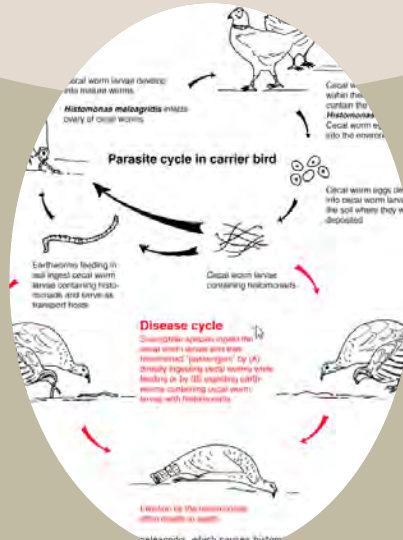
Histomonas
meleagridis

SPECIES AFFECTED



Turkey, quail, grouse,
domestic poultry

TRANSMISSION



Complex life cycle, ingestion
of snail containing parasite

CLINICAL SIGNS



Head tilt, ruffled
feathers, wing droop

DIAGNOSIS



Gross lesions
Histo

Trichomoniasis

CAUSATIVE AGENT



Trichomonas gallinae

SPECIES AFFECTED



Doves, raptors,
domestic birds

TRANSMISSION



Contaminated food or
water, bedding, courtship
behavior, predation

CLINICAL SIGNS



Depressed, ruffled
feathers, excessive
salivation

DIAGNOSIS



Gross lesions
Histo

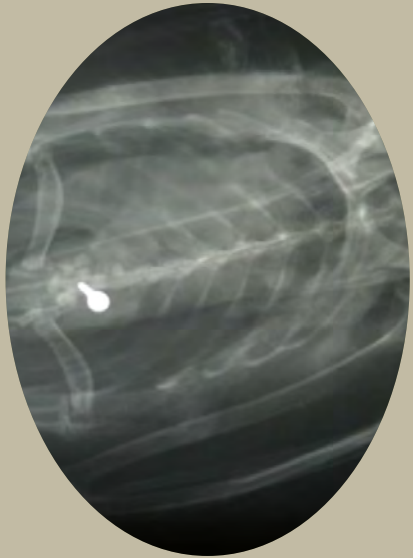
TREATMENT & CONTROL: None

The background features a light grey base with several overlapping organic shapes. A large, dark brown shape is on the left, and a large, olive green shape is on the right. In the top left, there are faint, stylized grey patterns resembling pine needles or fern fronds. A white, wavy line curves across the bottom right area.

Toxins/ Poisons

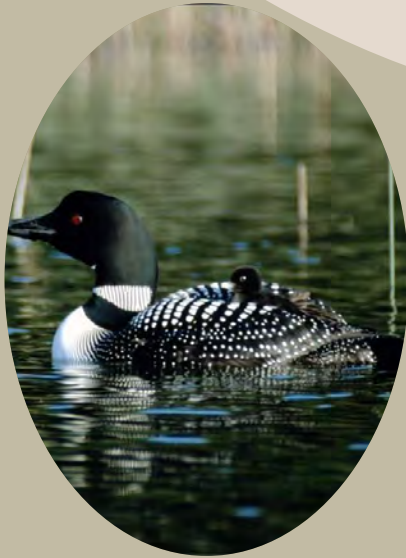
Lead Toxicosis

CAUSATIVE AGENT



Spent lead shot,
discarded fishing
tackle

SPECIES AFFECTED



Swans, loons, eagles,
geese, scavengers

TRANSMISSION



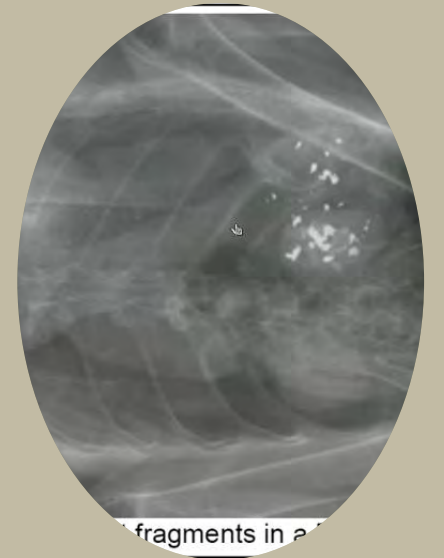
Ingestion of lead

CLINICAL SIGNS



Weakness,
depression, loss of
body condition

DIAGNOSIS



Gross lesions
Radiograph
Toxicology (metals)

TREATMENT & CONTROL: Education campaigns, voluntary shift to non-toxic alternatives, legislation

Lead Toxicosis in Eagles and Loons

Eagles

- Ingestion of fragmented lead bullets in deer carcasses or gut piles
- 1987-2022 (n=2,212)
 - Trauma (car): 34.0%
 - Trauma (misc, unk.): 25.6%
 - Lead toxicosis: 12.8%

Loons

- Ingestion of lost or discarded fishing tackle – jigs and sinkers
- 1987-2022 (n=479)
 - Trauma: 24.4%
 - Type E Botulism: 21.3%
 - Lead poisoning: 14.4%

Other poisons

OIL INTOXICATION

ORGANOPHOSPHATE

ORGANOCHLORINE

YEW

FRUIT INTOXICATION



Oil spills
Waterfowl



Herbicides/Pesticides



DDE/DDT
environmentally persistent



Turkeys



Fermented crab
apples
Cedar waxwings

The background features a light grey base with large, overlapping organic shapes in muted green and brown. Stylized foliage patterns are visible in the top-left and bottom-left corners. A white wavy line curves across the bottom right.

Trauma

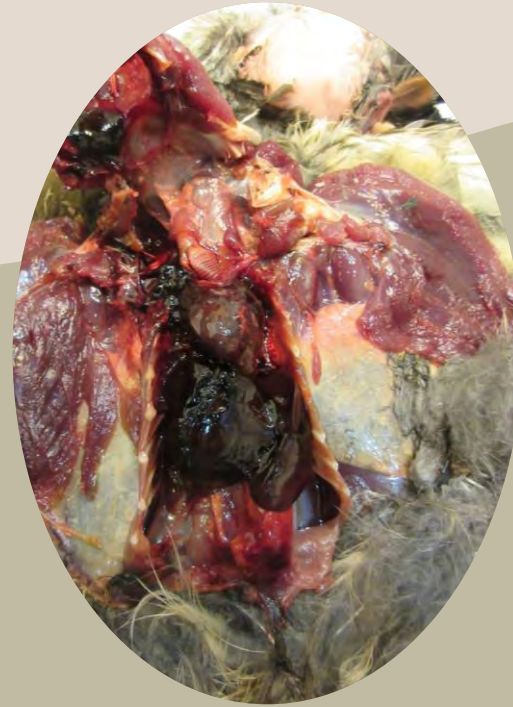
Trauma



FISHING LINE
ENTANGLEMENT



BLUNT FORCE



BLUNT FORCE



SHOT

Trauma



VEHICLE STRIKE



WIND TURBINE



ELECTROCUTION



ELECTROCUTION

What can you do?

- Keep food stored in a dry place in a container with a lid to prevent mold and mouse droppings
- Regularly clean feeders
- Report sick/dead birds
- Remove feeders if sick birds are observed
- Consider using non-lead alternatives for fishing and hunting



BE PROACTIVE! Don't wait until you see sick birds!



Cleaning Feeders

- o Clean at least every 2 weeks, more frequently during wet or humid conditions
- o Remove seed and scrub off any debris with coarse brush and dish soap
- o Soak feeder in 10% bleach solution (1 part bleach, 9 parts water) for 10 minutes
- o Rinse thoroughly and dry completely before refilling

What to do if you see a sick/dead bird

- o Report online at:

www.michigan.gov/eyesinthefield

- o Call the MI DNR Wildlife Disease Lab at 517-336-5030

- o Collect and freeze for testing





thank you

Julie Melotti

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517-336-5042

www.eyesinthefield.com