

Disease occurrence in raccoons (*Procyon lotor*) from rural and urban populations in Germany - Preliminary results -

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IM FORSCHUNGSVERBUND BERLIN E.V.

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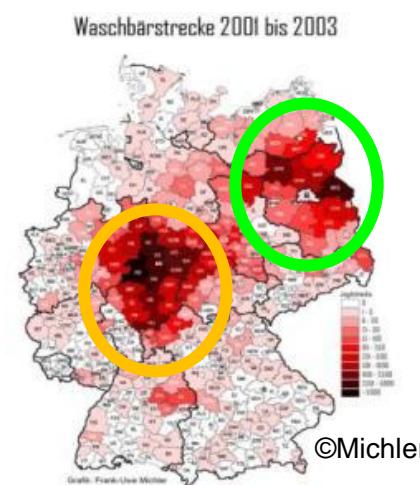


North American raccoons (*Procyon lotor*)

Introduced species in Europe, Caucasus & Japan



Germany: First introduction 1934
→ 2 core populations



Why raccoons?

Introduced species in Europe

Very adaptable species → rural & urban areas

Close contact: humans, domestic animals & wildlife

Vector for infectious diseases in North America

What diseases occur in raccoons in Germany ?

Differences between rural and urban populations ?

→ Interaction with other animals/humans ?

Projekt Waschbär (F.-U. + B. Michler)

Müritz National Park (MNP) population

Raccoon population ecology in Germany

Research foci:

Spatial & migration behaviour

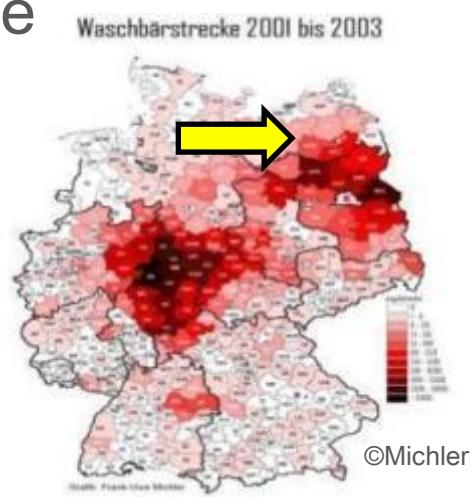
Population structure & size

Social system

Epidemiology

Reproduction

Feeding ecology



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Study area

Müritz National Park



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Berlin metropolitan area

Material & Methods

Raccoon carcasses

Road-killed, hunted or euthanized



Necropsy

Carcass condition

Macroscopic changes

Organ samples



Material & Methods

Histology of organ tissues

4% formalin

H&E staining



Bacteriology

Suspicious organ lesions

Bacteriology lab, Dr. Grobbel (IZW)



Material & Methods

Parasitology

Main focus: *Baylisascaris procyonis*

Helminth & ectoparasites



Virology (as reported in American raccoons)

Canine Distemper Virus (CDV)

Parvovirus (PV)

Infectious canine hepatitis (CAV-1)

Aujeszky's Disease (SuHV-1)

PCR & RT-PCR assays + cell cultures

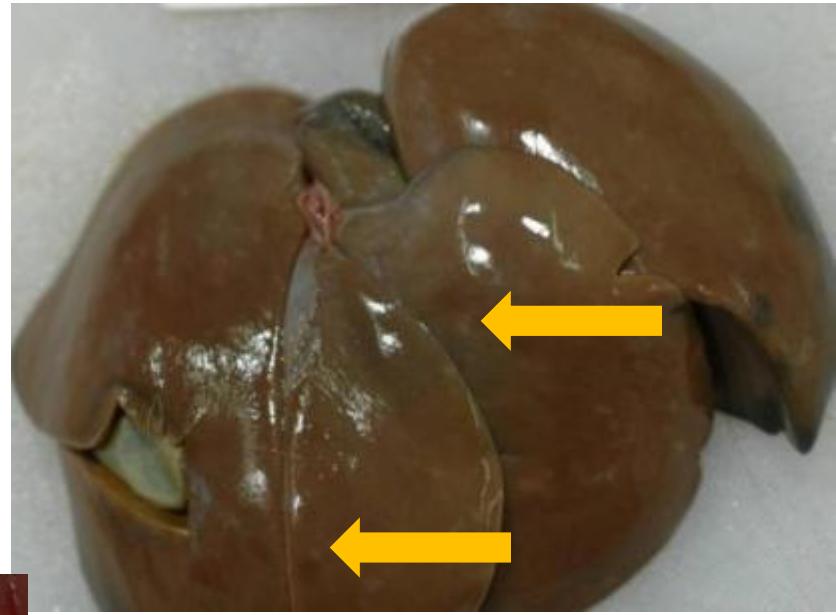
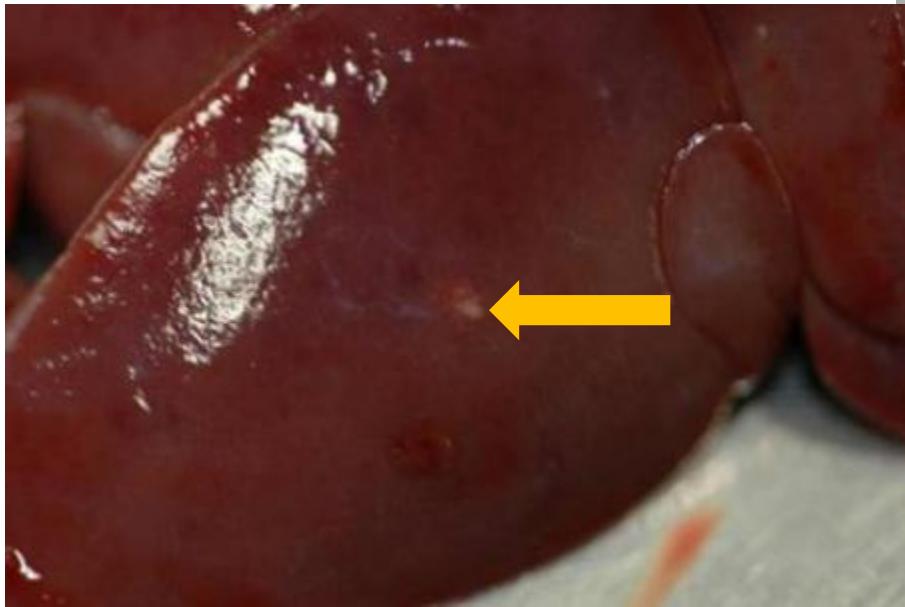


Preliminary results

Macroscopic changes

Liver :

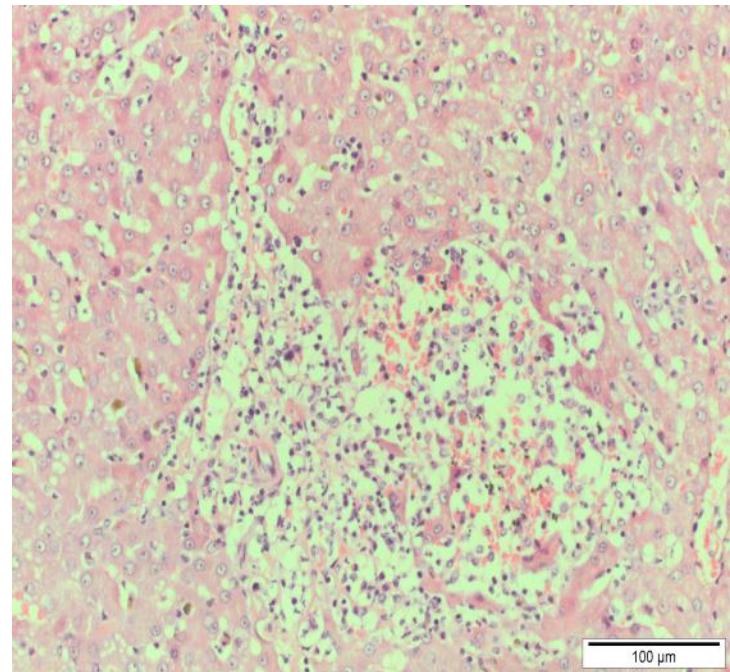
Multifocal capsular white foci



Preliminary results

Microscopic changes

Inflammatory changes



Preliminary results

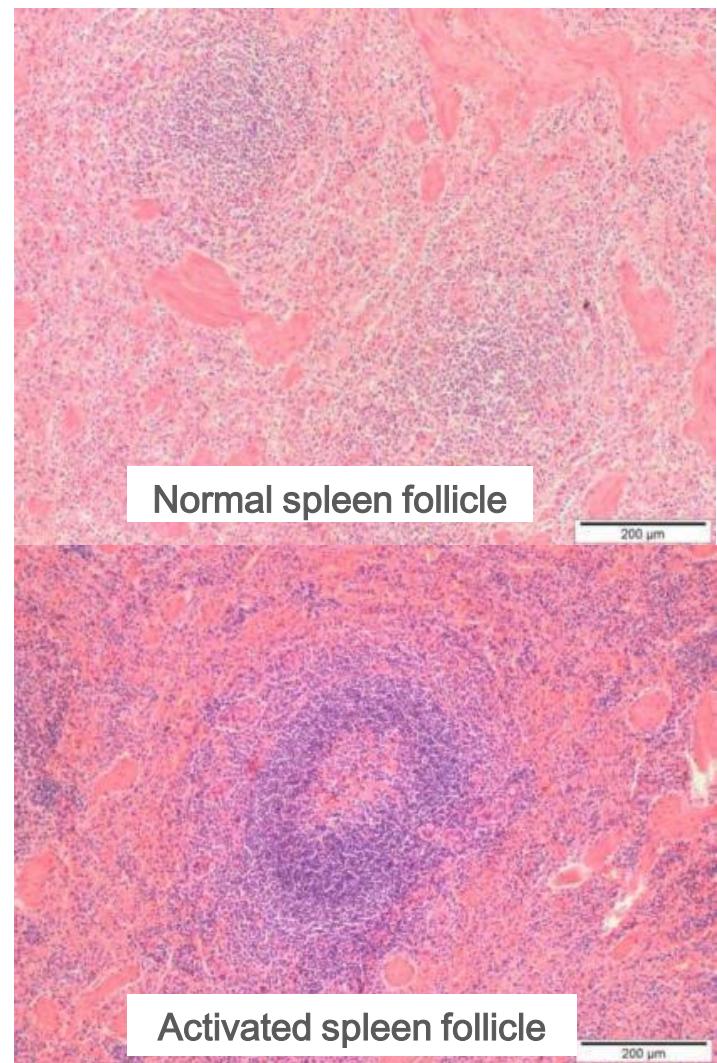
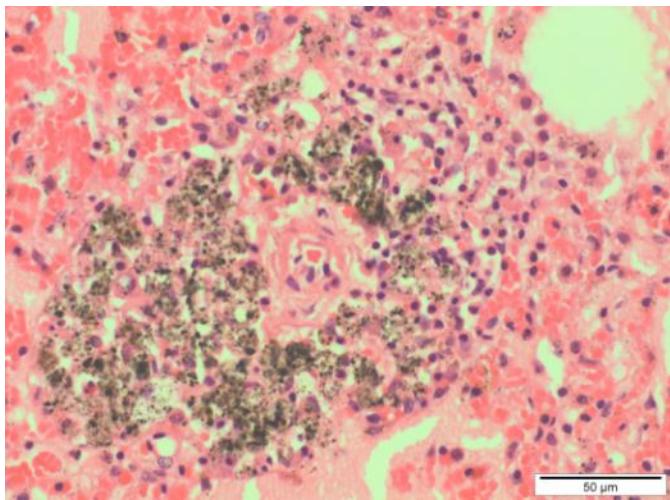
Microscopic changes

Inflammatory changes



Anthracosis in Berlin animals

Coal particles in the lung



Preliminary results

Samples of 12 animals sent to **Bacteriology**:

Bacteria associated with pathological findings:

Yersinia enterocolitica → Liver abscess

Clostridium perfringens type A → Haemorrhagic enteritis

Parasitology:

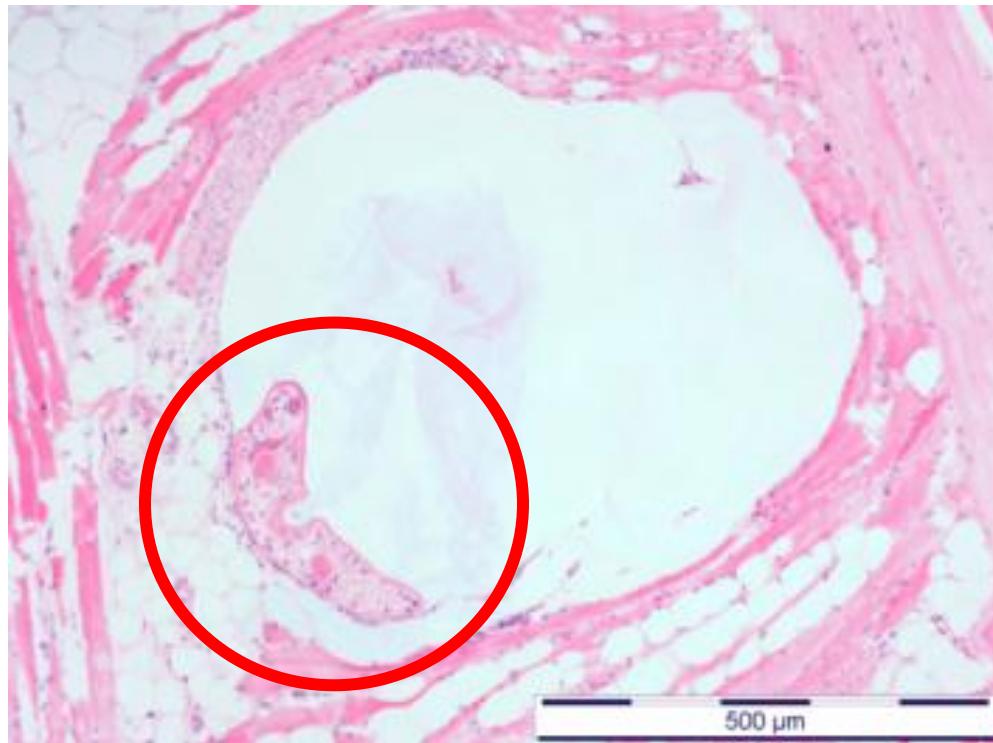
Baylisascaris procyonis: Not found in any animal

Unidentified trematode in tongue tissue of MNP animals →

Unidentified trematode in raccoons

Parasite morphology

→ suspicious for mesocercarial stage of *Alaria alata* !?

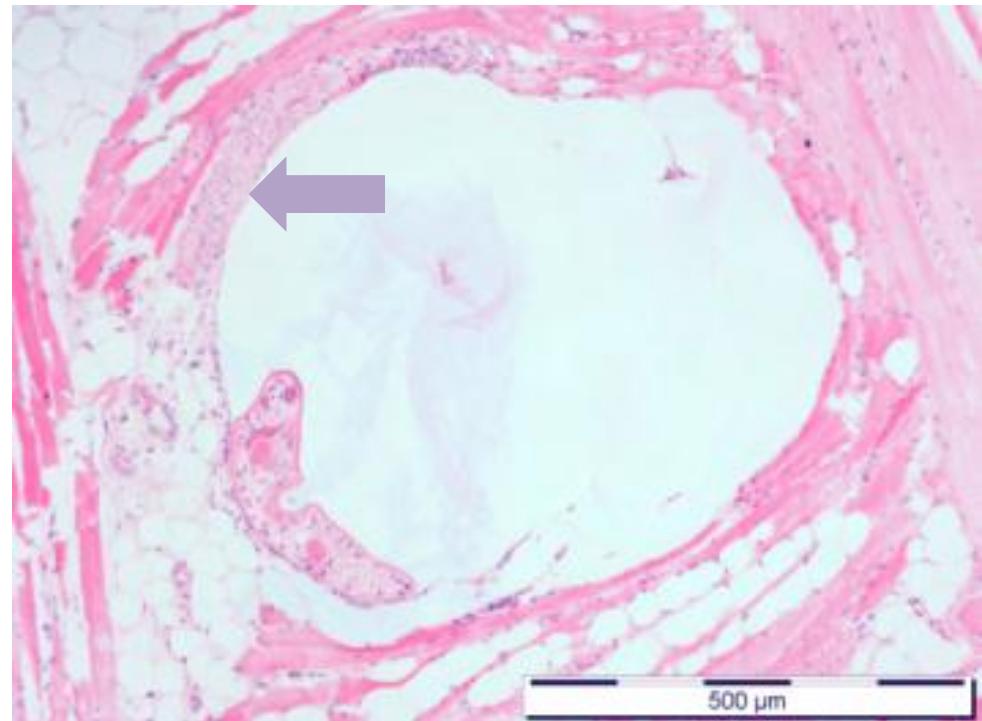


Histology examination of tongues

Parasitic cysts
adjacent to blood vessels

Location: connective tissue

Local inflammatory response

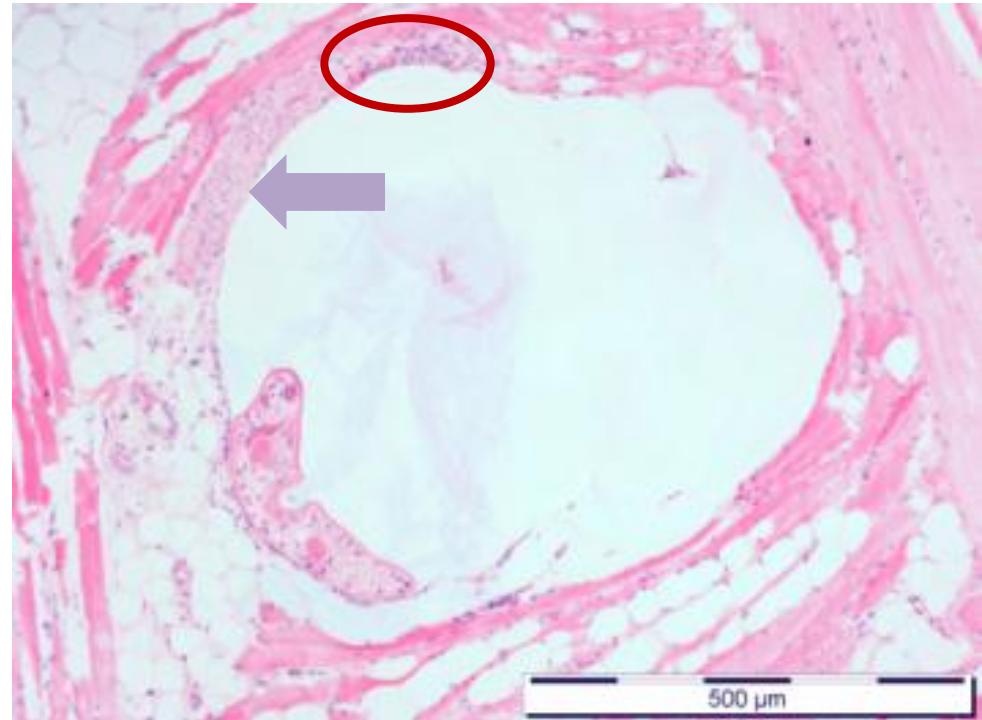


Histology examination of tongues

Parasitic cysts
adjacent to blood vessels

Location: connective tissue

Local **inflammatory response**



→ Hematogenic spread of the mesocercariae !

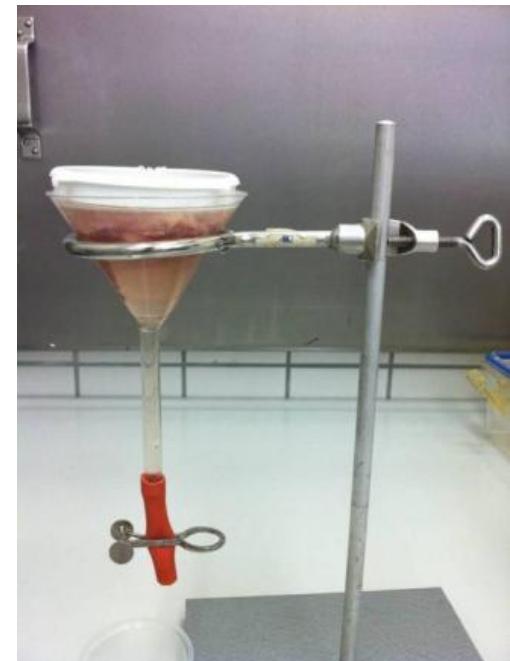
Unidentified trematode in raccoons

Cooperation with Leipzig University (Dr. K. Riehn):

Tongues of 35 raccoons examined

Mesocercaria isolation (Riehn et al., 2011)

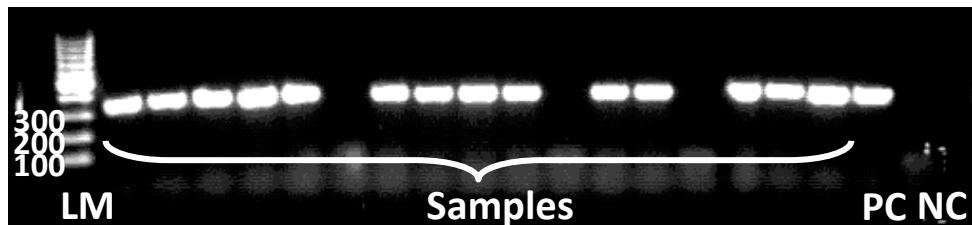
Trematode identification → PCR assay



Mesocercariae in raccoons from Germany

Isolation of mesocercaria (n=11/35)

PCR positive for *Alaria alata* (n=10/11)



MNP n=9/10; Berlin n=1/10

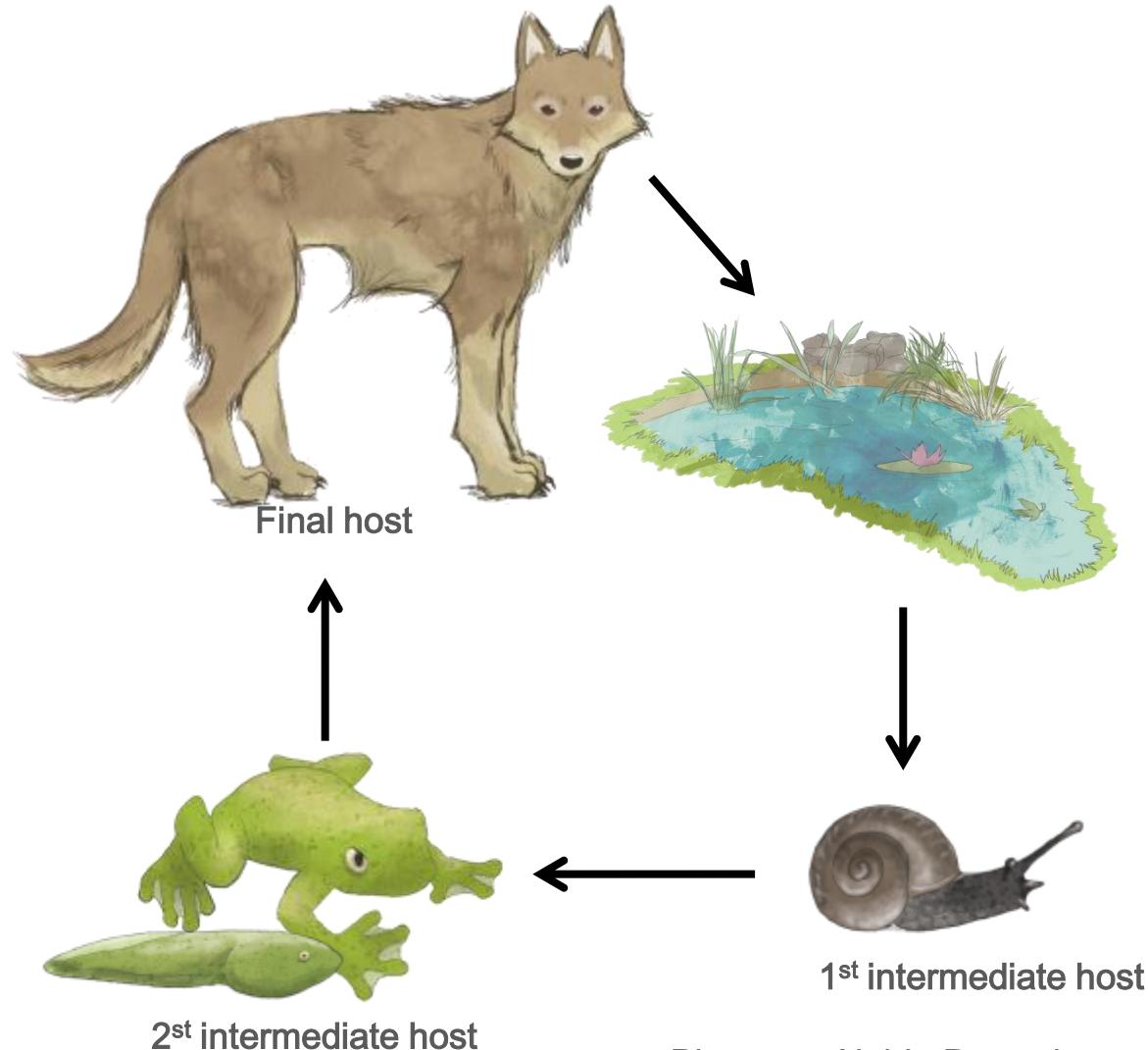
Broad host range → adaptation to introduced species

Raccoons → paratenic host

Lower occurrence in urban areas → lack of intermediate hosts

Life cycle of *Alaria alata*

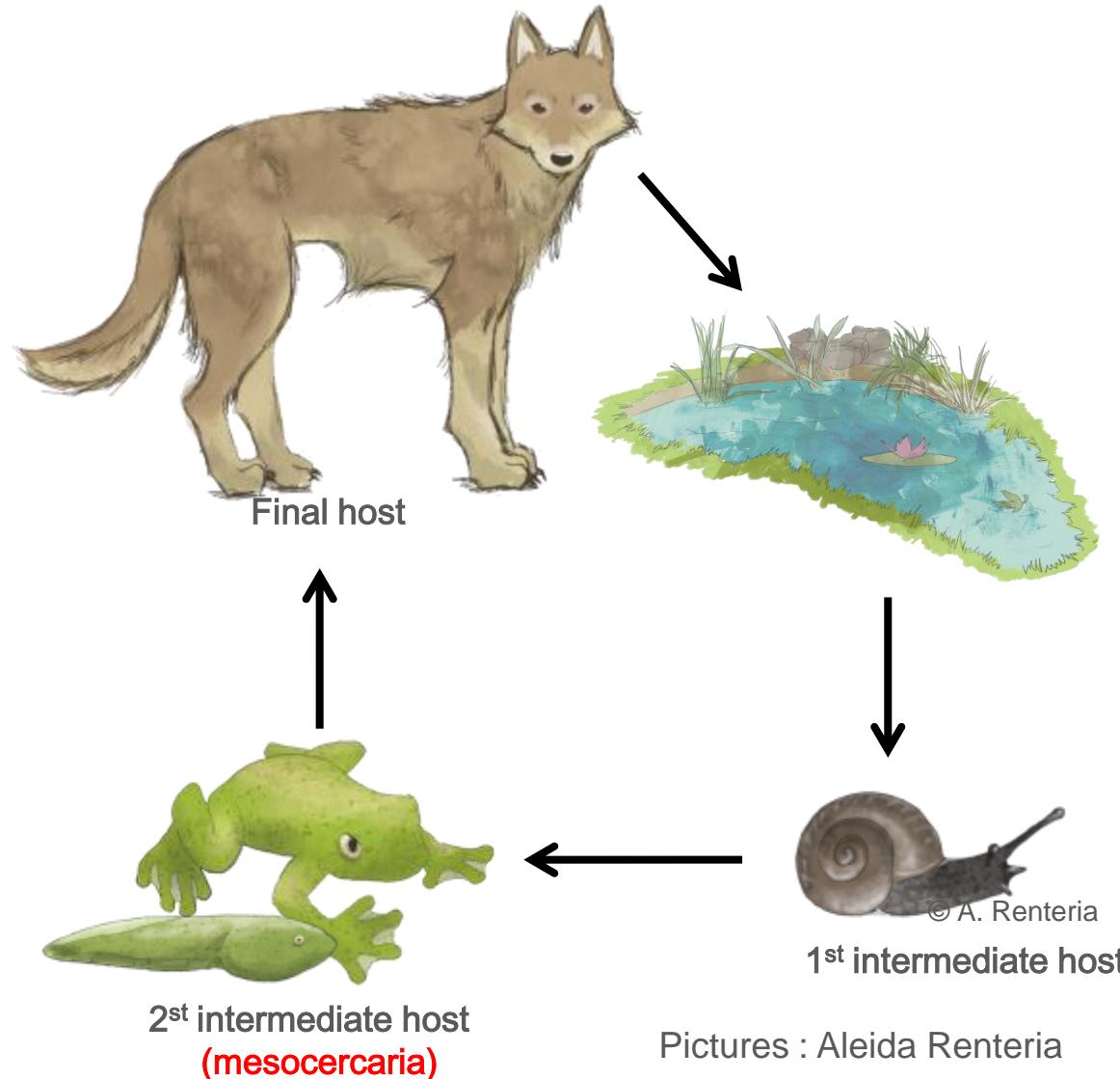
Egg → miracidium → 1st sporocyst → 2nd sporocyst → cercaria → mesocercaria → metacercaria → adult.



Pictures : Aleida Renteria

Life cycle of *Alaria alata*

Egg → miracidium → 1st spoorocyst → 2nd spoorocyst → cercaria → **mesocercaria** → metacercaria → adult.



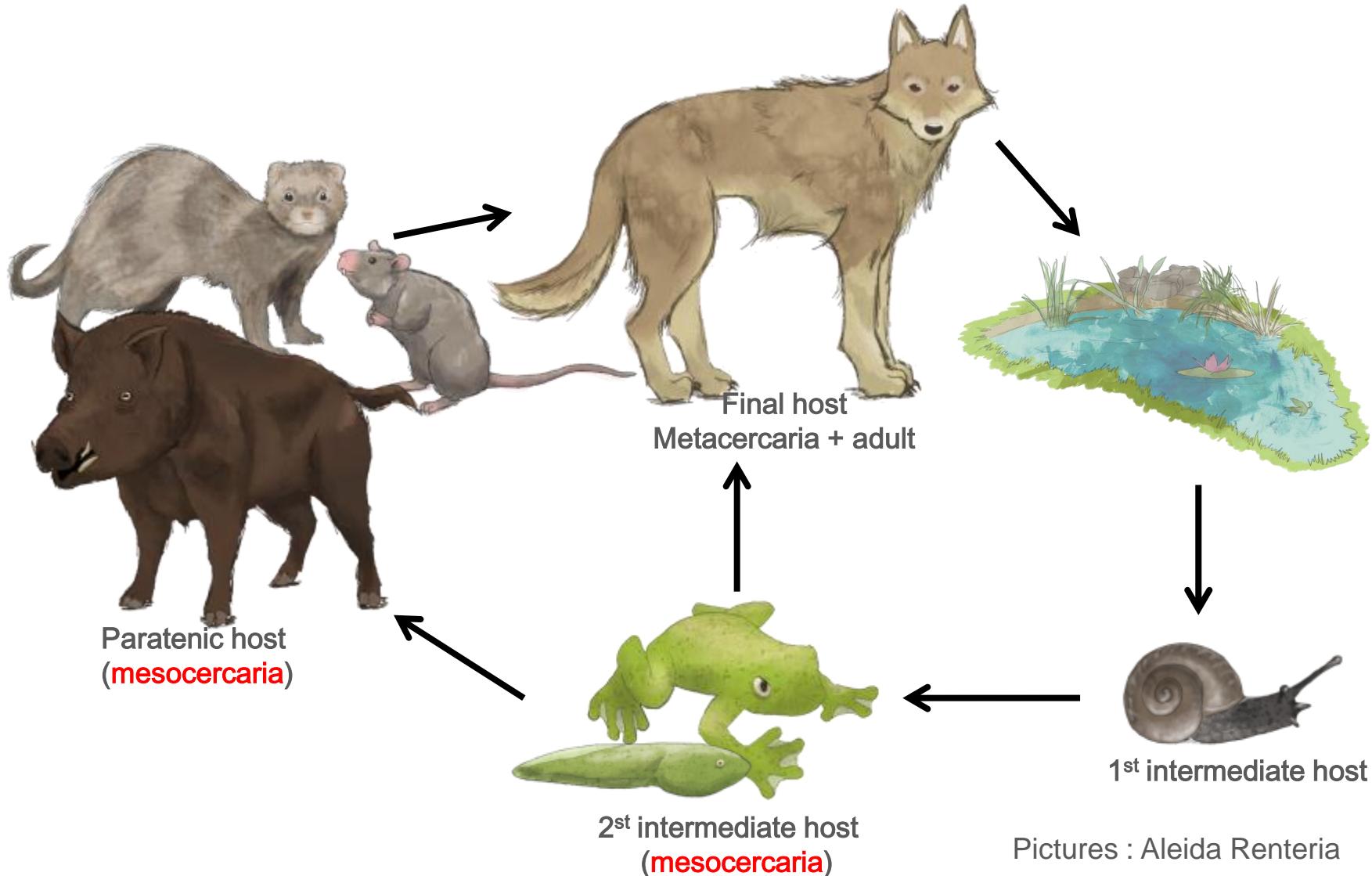
© A. Renteria
1st intermediate host

2st intermediate host
(mesocercaria)

Pictures : Aleida Renteria

Life cycle of *Alaria alata*

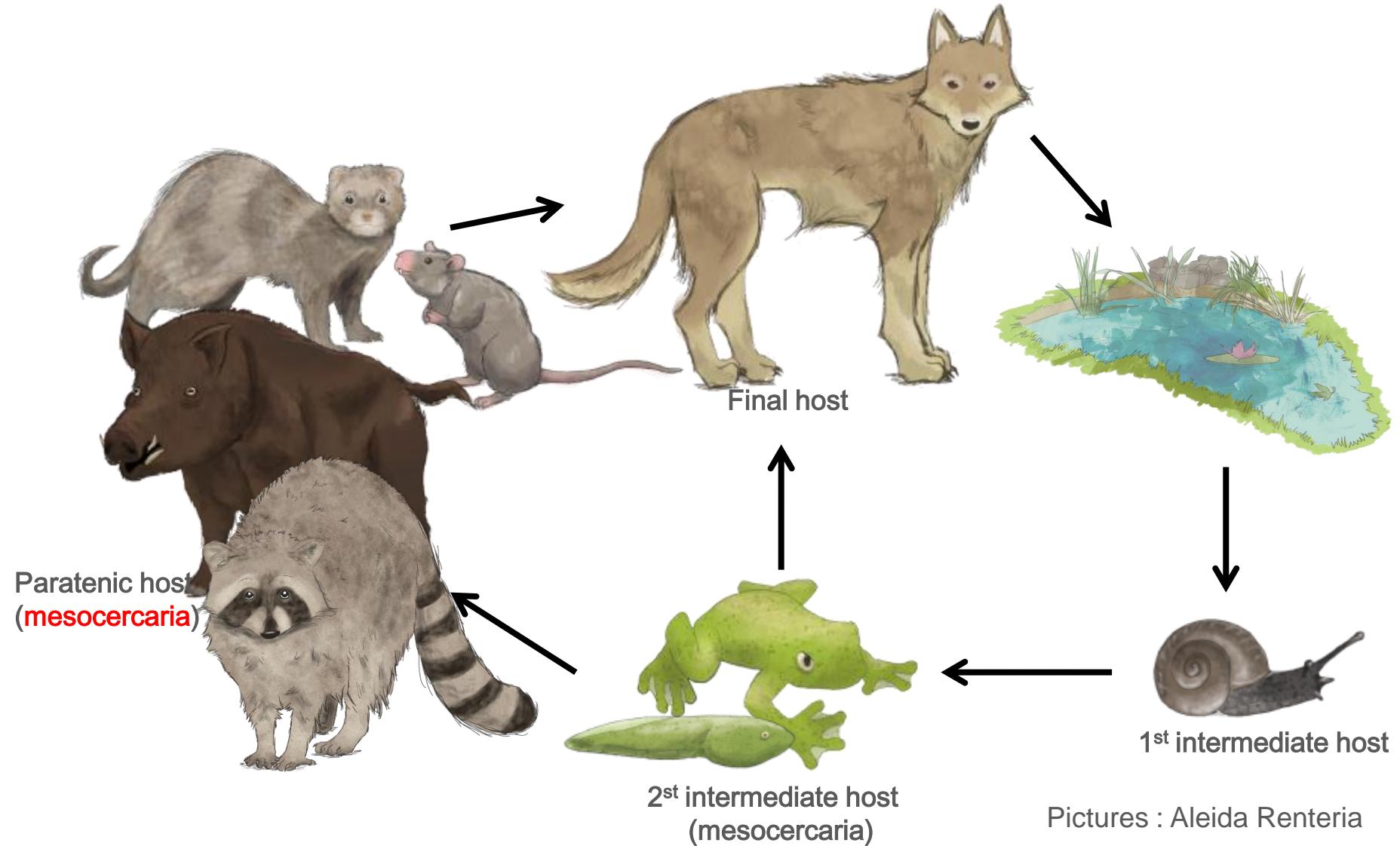
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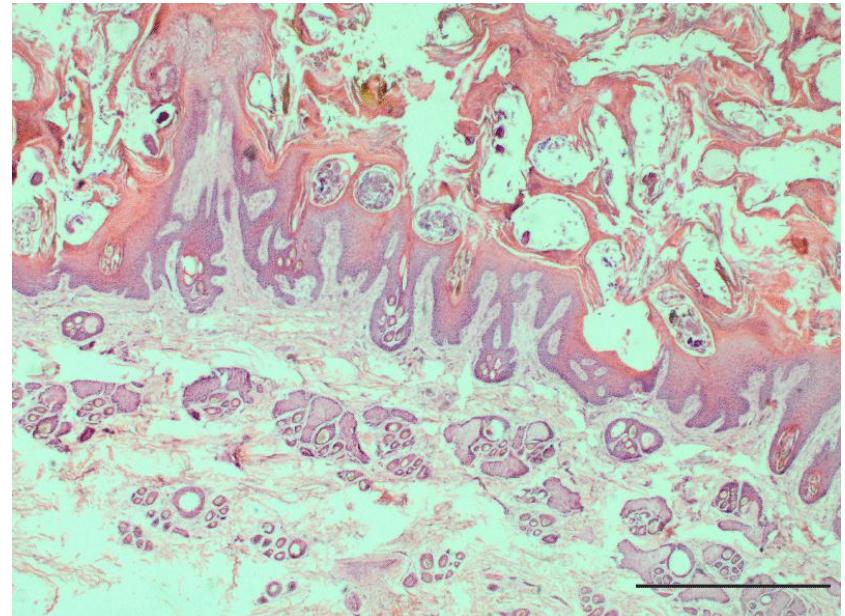
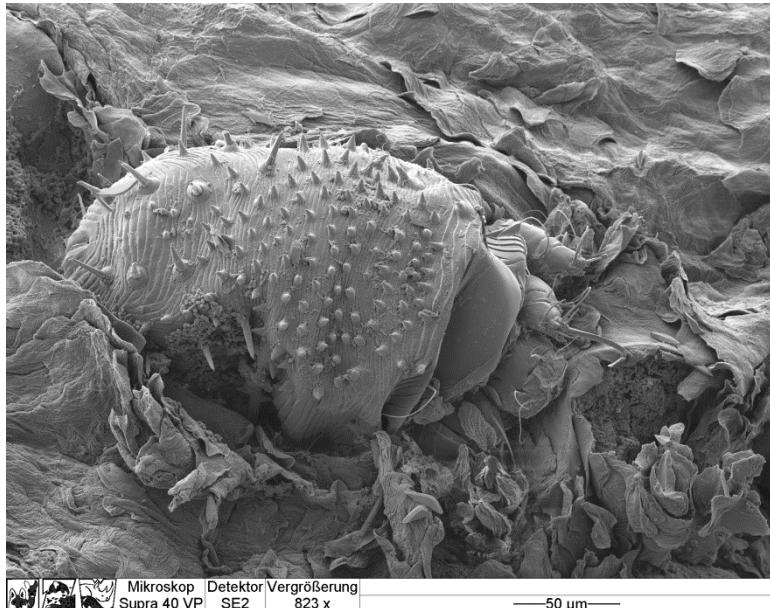


Sarcoptic mange in urban raccoons

Raccoons from Berlin

Severe skin infection by intracorneal mites = *Sarcoptes scabiei*

Only 1 previous report in raccoons from US (Fitzgerald et.al., 2004)



Contact with urban wildlife/pets !

Current work: Virology screening

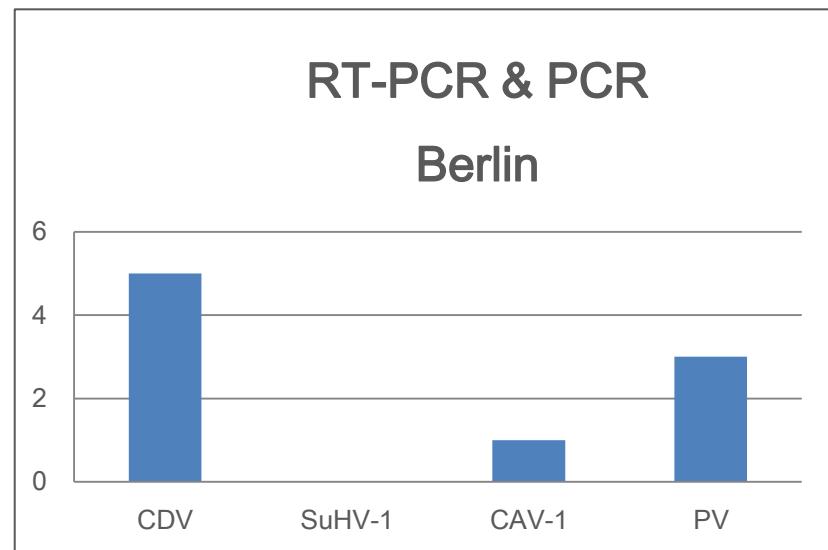
Cooperation with Giessen University (Dr. M. König)

Frozen organ samples -80°C

First screening of Berlin animals

9 positive for viral nucleic acids

Sequencing & phylogenetic analysis



Current work: Berlin distemper outbreak

Started December 2012

Organs from Berlin raccoons

RT-PCR assays

Comparison with MNP outbreak, 2007 (Michler et al., 2009; Nikolin et al., 2011)

Acknowledgments



“Projekt Waschbär” team & colleagues
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Images *A. alata* life cycle: Aleida Renteria



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