

Unsuspicious immigrant or ecological threat: *a long-term fieldwork study on the introduced raccoon in Germany*



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Berit Michler

Outline



- raccoon settlement and current situation in Germany
- applied research on raccoons:
„Projekt Waschbär“
 - topics of research
 - selected results

Taxonomy



- class: mammals
- order: carnivora
- superfamily: musteloidea
- family:

Ailuridae (red panda)

Mephitidae (skunks)

Mustelidae (weasel family)

Procyonidae (procyonids) → 6 genus, 13 species



Taxonomy



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Taxonomy



raccoons → 1 genus (*Procyon*), 3 species



Procyon lotor

(Hunter & Barrett 2012)

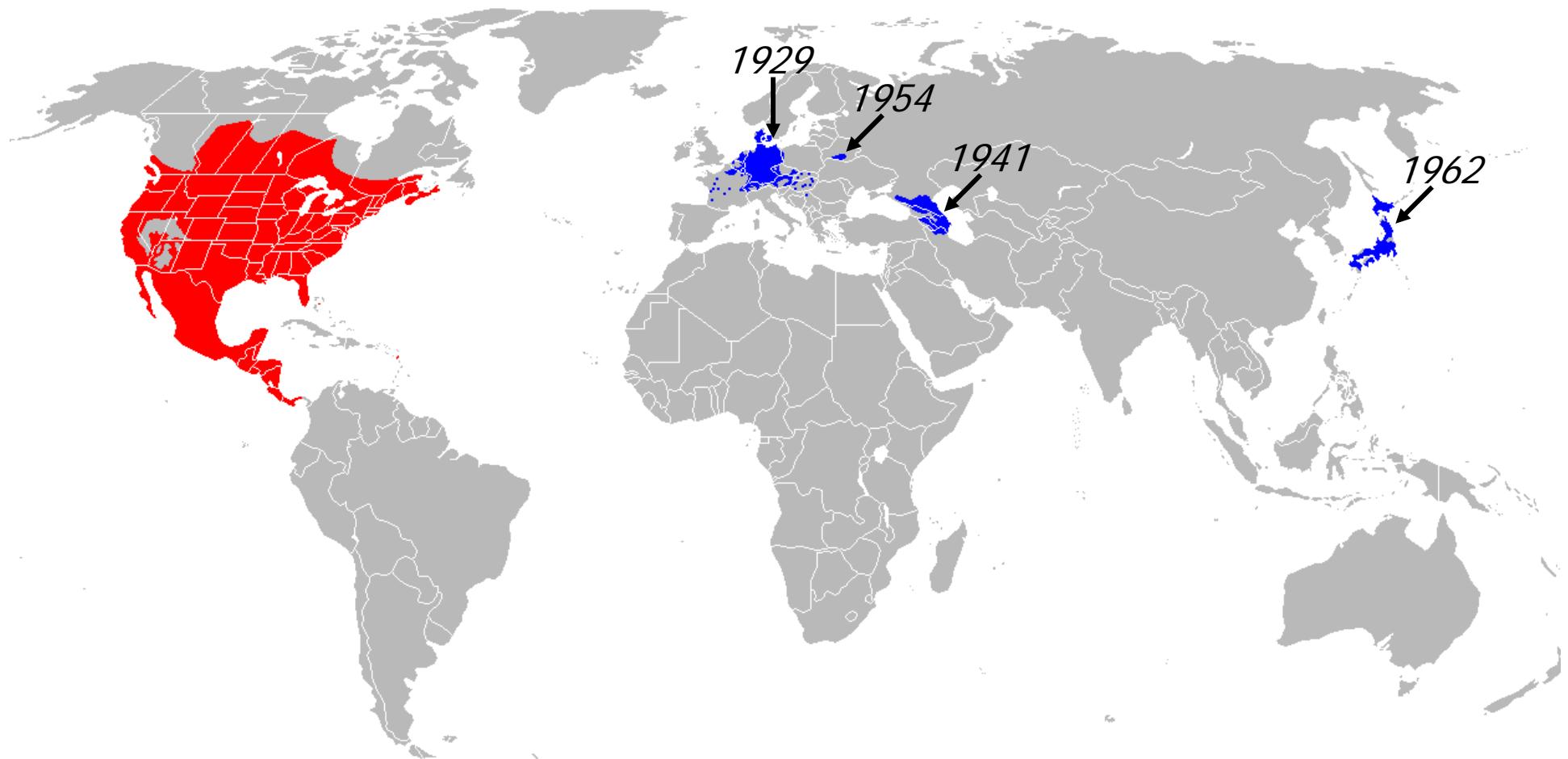


Procyon cancrivorus



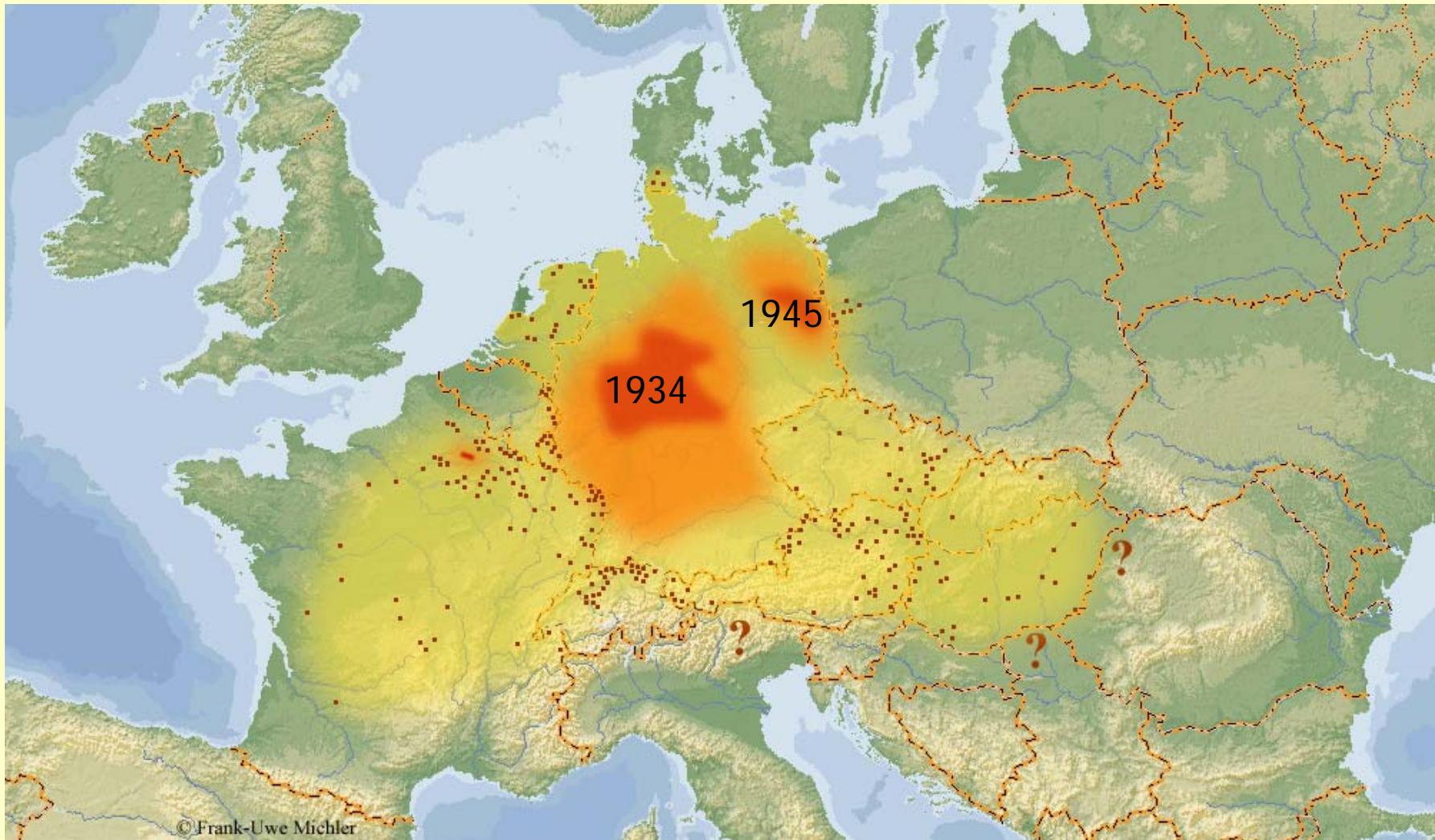
Procyon pygmaeus

Geographic range





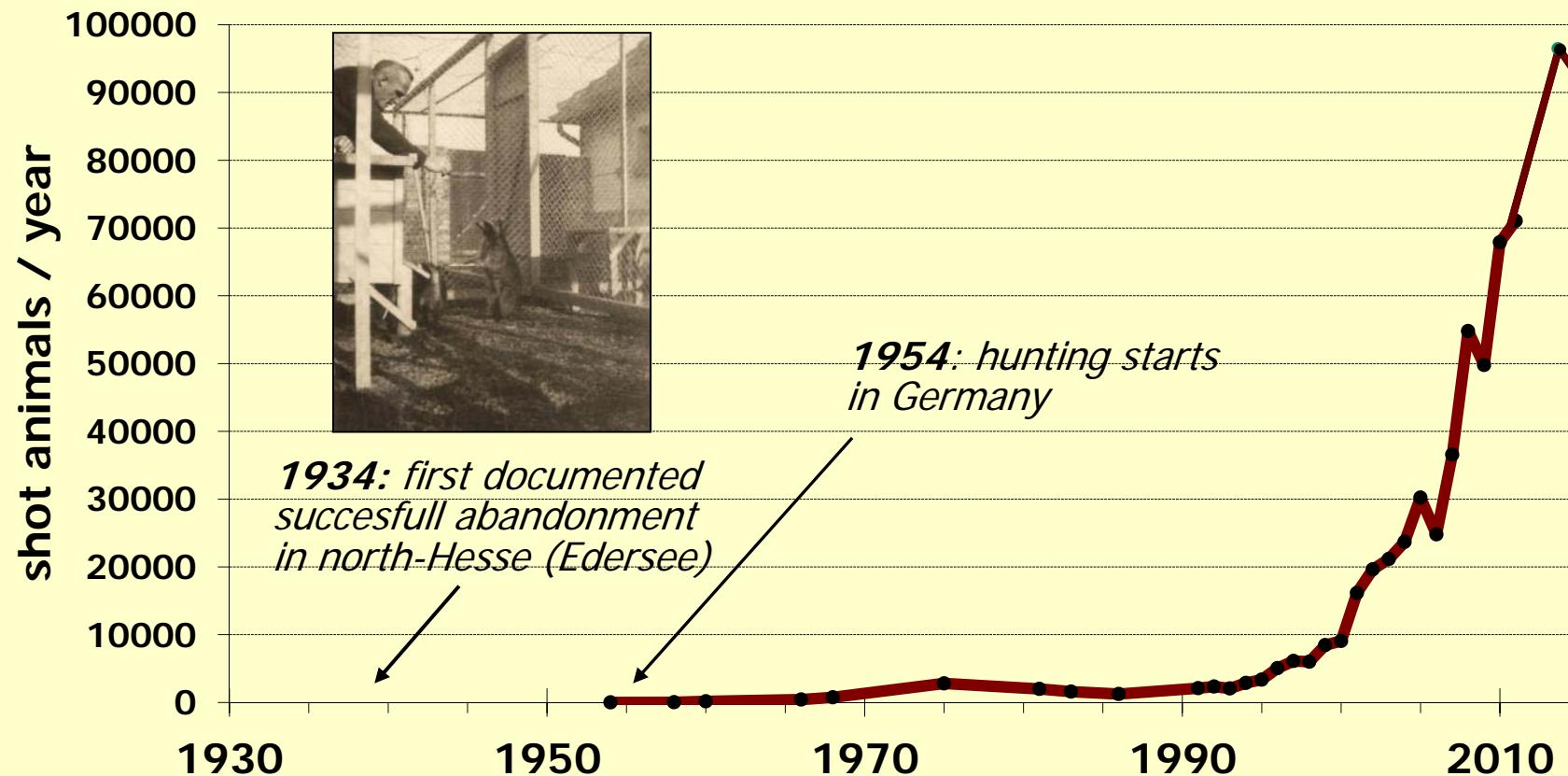
Geographic range



Geographic range



Hunting bag development in Germany



Characteristics



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Technische Universität Dresden (chair of forest zoology)
Working Group Wildlife Research (Tharandt)

Characteristics



Mikulov, 5.3.2015

Berit Michler

Characteristics



Characteristics



I. Bartussek



I. Bartussek

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Characteristics



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Current situation in Germany



- raccoons are indigenous according to the Federal Nature Conservation Act (BNatschG §5)
- controversial and highly emotional discussion concerning the impacts of raccoon settlement in Germany
- raccoons are expected to be problematic:

3 levels of impact



Current situation in Germany



- economic effects



Current situation in Germany



- economic effects
- hygienic relevance



I. Bartussek



Current situation in Germany



- economic effects
- hygienic relevance
- ecological effects



Current situation in Germany



- raccoons are still among the least investigated carnivores in Europe
- better founded knowledge is essential in order to evaluate potential impacts



→ lack of knowledge

Research on raccoons in Germany



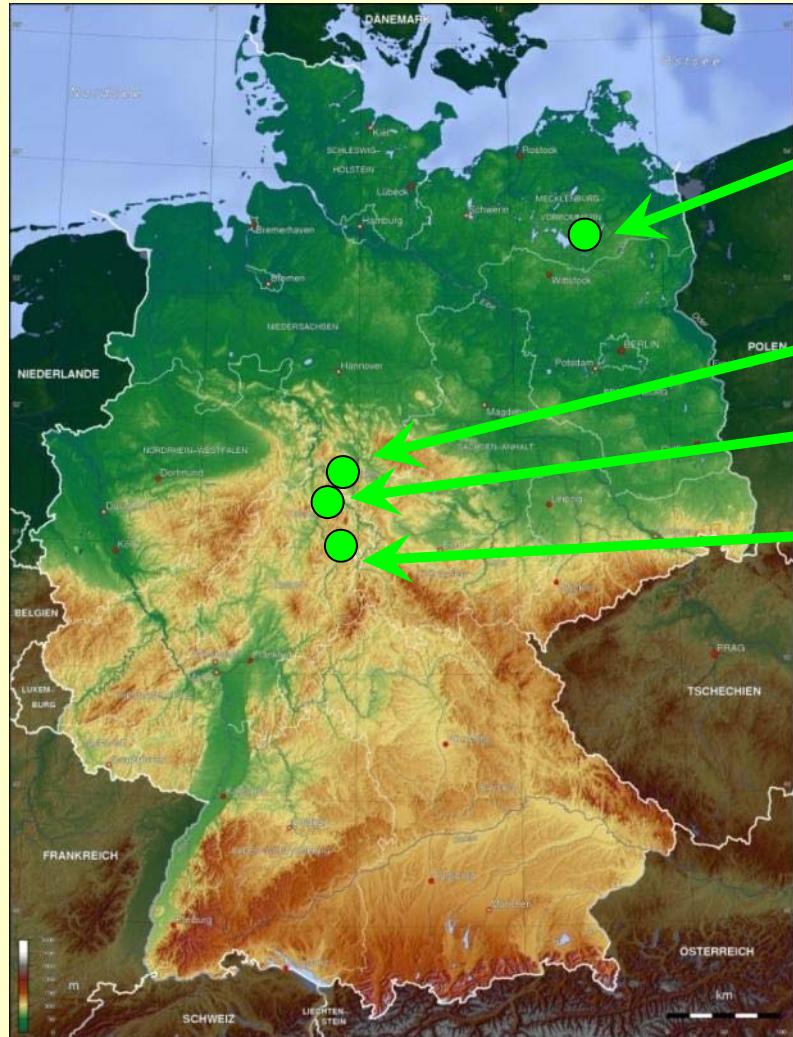
4 research studies

→ *Society for Wildlife and Nature Conservation (GWN)*



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Research on raccoons in Germany

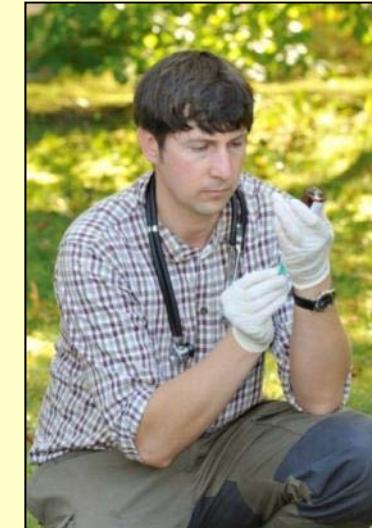


Müritz National Park

Solling

Bad Karlshafen

Kassel



„Projekt Waschbär“ – Müritz National Park



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„Projekt Waschbär“ – study area



- optimal habitat for Central Europe
- highest density ever measured in Europe for a natural habitat until now (6-8 individuals/km²)



- area under investigation: 60 km²

„Projekt Waschbär“ – topics of research



1. spatial use

(home-range sizes, den sites, habitat use, dispersal behaviour)



„Projekt Waschbär“ – topics of research



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2. feeding ecology/parasitology

(food spectrum, endoparasite infestation)



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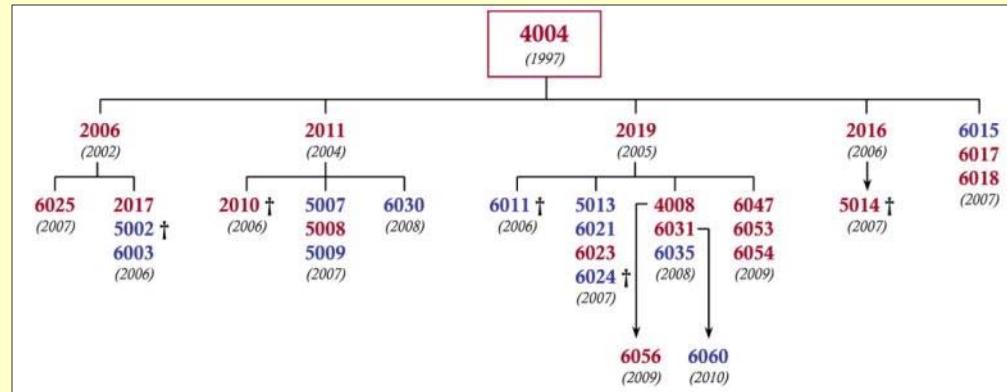
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(mating- and cubbing season, litter size, parentship, MHC-dependant mate selection)



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(histo-pathologic & serologic tests)



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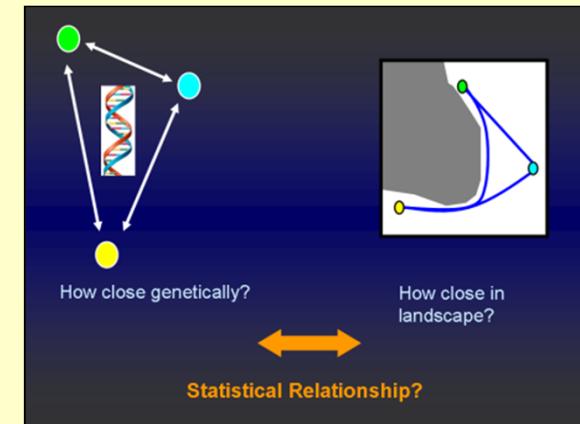
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(histo-pathologic & serologic tests)

8. landscape genetics

(impacts of spacial movement patterns)



„Projekt Waschbär“ – data basis



VHF- telemetry

„Projekt Waschbär“ – data basis



expanding
radio-collars



R. Vitt

„Projekt Waschbär“ – data basis

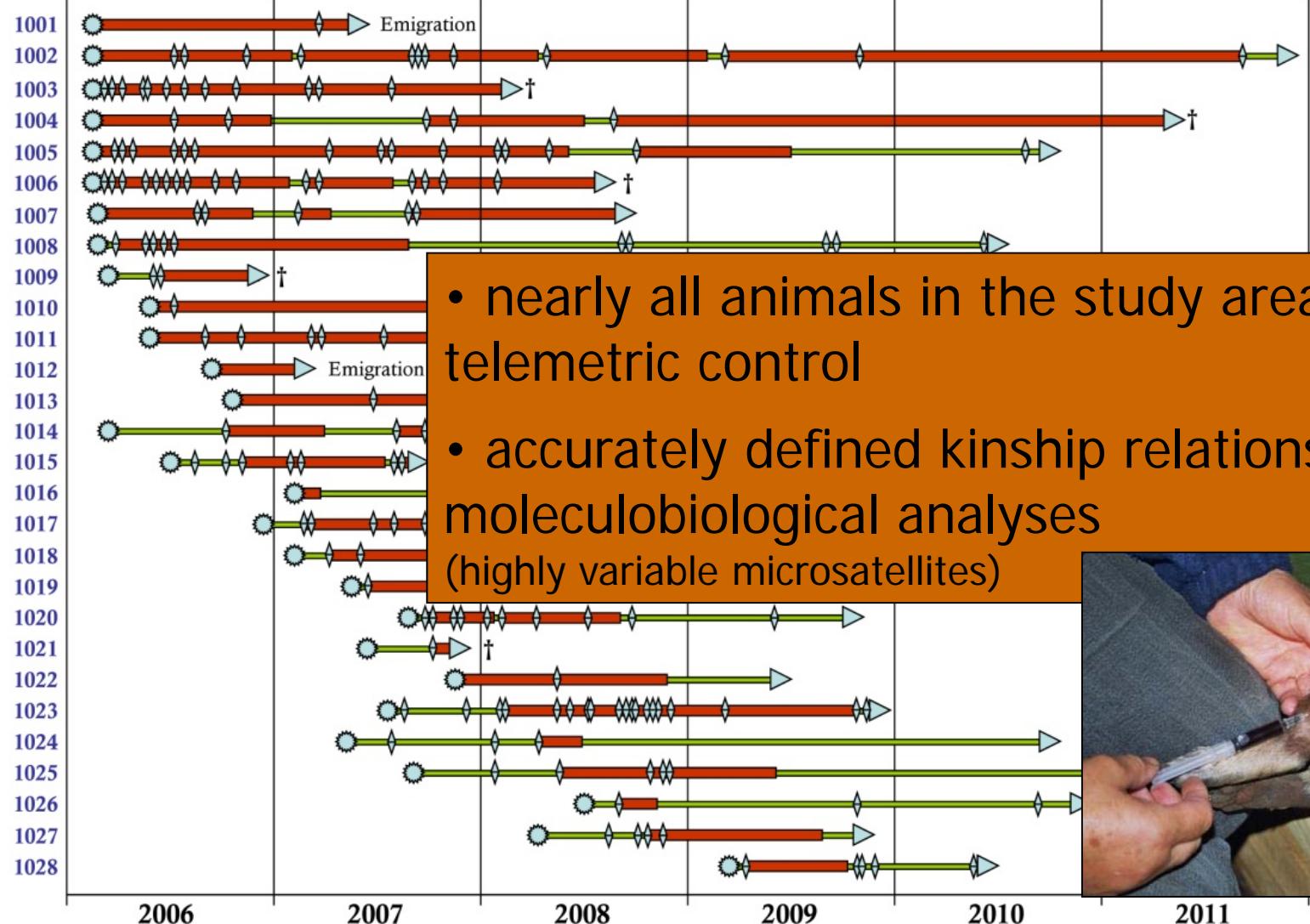


march 2006 – november 2011:

- **489** raccoon captures
 - **145** different individuals
 - **69** fitted with radio-collars (23 ad. ♀; 28 ad. ♂; 18 juveniles)
- **31.193** localizations (12.931 by day, 18.262 at night)
- **24.959** pictures from camera traps (5365 trap nights)



„Projekt Waschbär“ – data basis



„Projekt Waschbär“ – selected results



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(impacts of spacial movement patterns)

„Projekt Waschbär“ – doctoral thesis



- main area of interest: what do the animals live off and does this affect indigenous species?



„Projekt Waschbär“ – doctoral thesis



- common feeding analysis are not sufficient for statements concerning the local ecological impact of raccoons



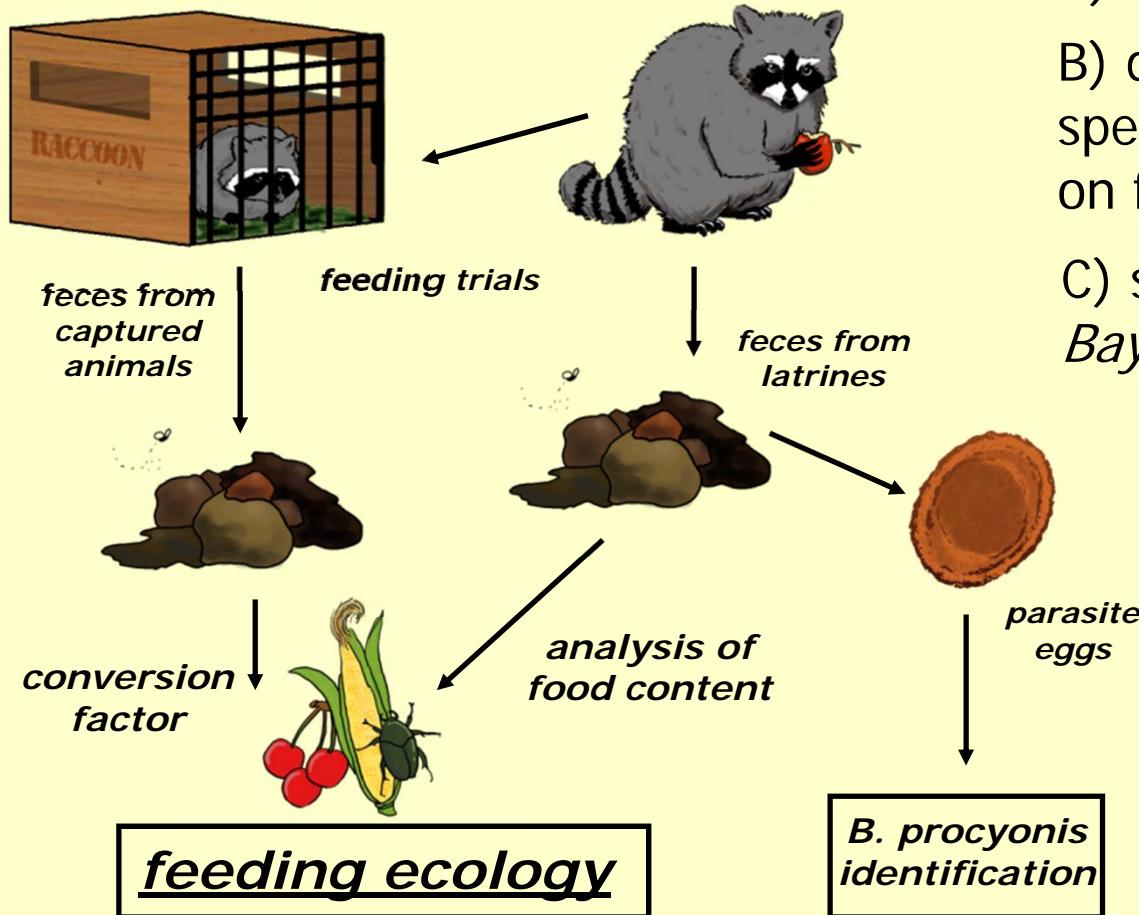
„Projekt Waschbär“ – doctoral thesis



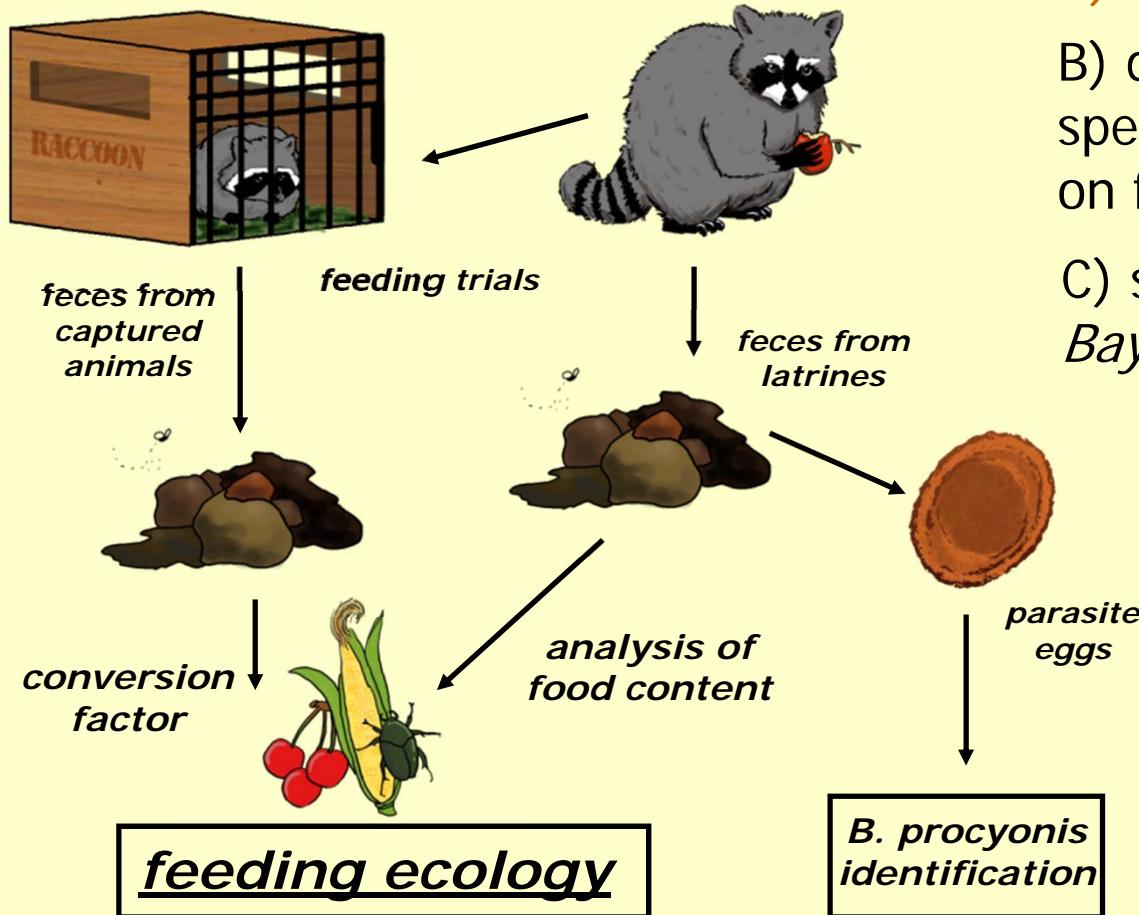
- common feeding analysis are not sufficient for statements concerning the local ecological impact of raccoons
- doctoral thesis: quantifying of data and intersection with local offer (n=1285 samples from the Müritz National Park)



„Projekt Waschbär“ – doctoral thesis



„Projekt Waschbär“ – doctoral thesis



A) feeding ecology investigation

B) determination of a raccoon-specific conversion factor based on feeding trials

C) scat analysis in respect of *Baylisascaris procyonis*

n=1285 fecal samples

„Projekt Waschbär“ – feeding ecology



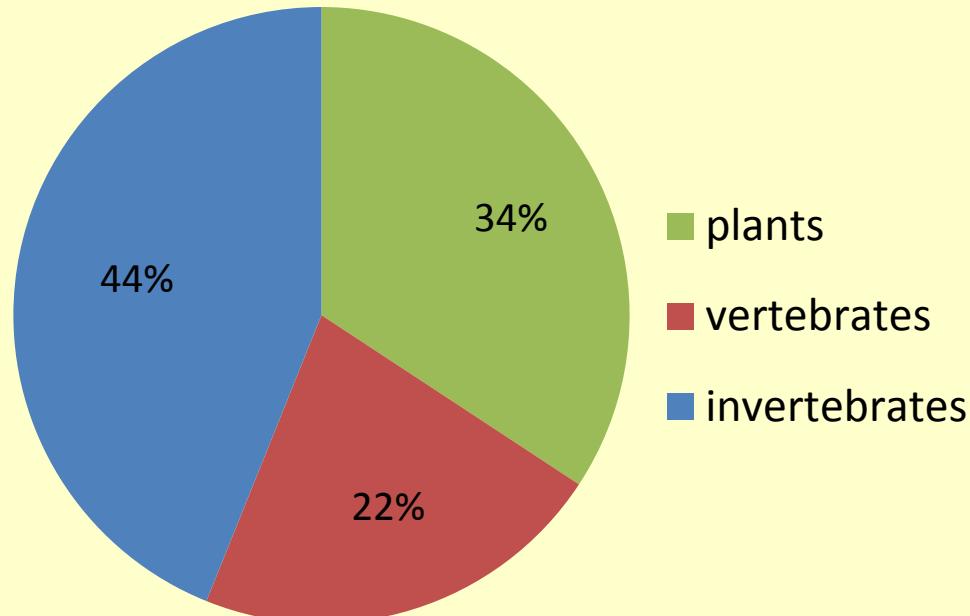
- fecal samples ($n=1285$) were collected from 90 different latrines between 2006-2011
- first results only relate to the rates of occurrence
→ biomass data remaining (even more informative)



„Projekt Waschbär“ – feeding ecology



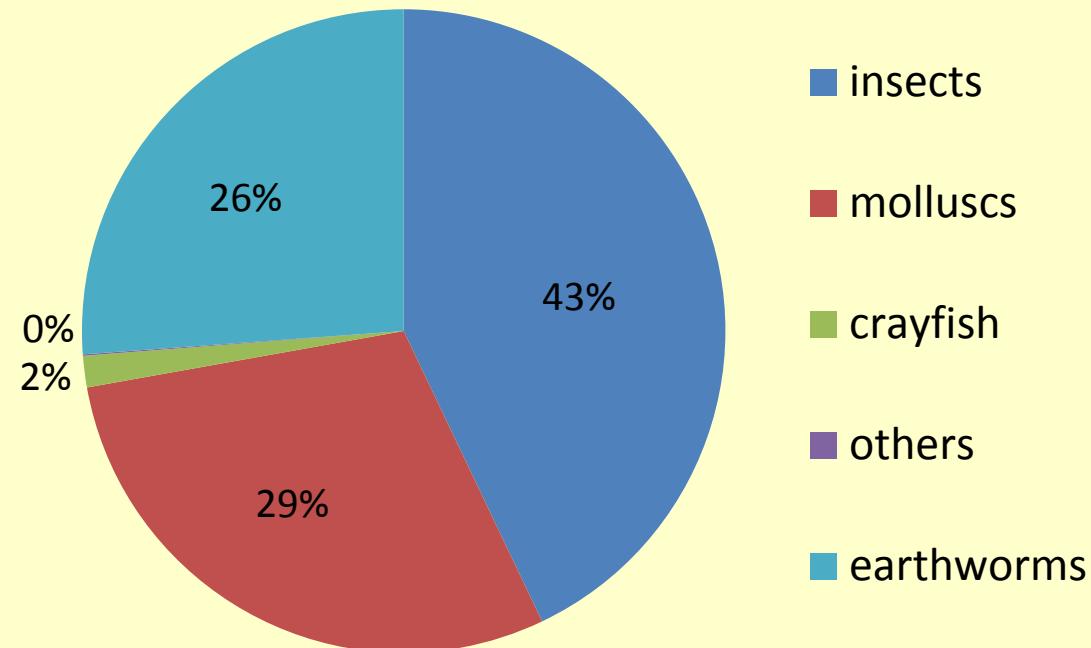
Müritz National Park (n=1285)



„Projekt Waschbär“ – feeding ecology



invertebrates (n = 1232; 44 %)



■ insects

■ molluscs

■ crayfish

■ others

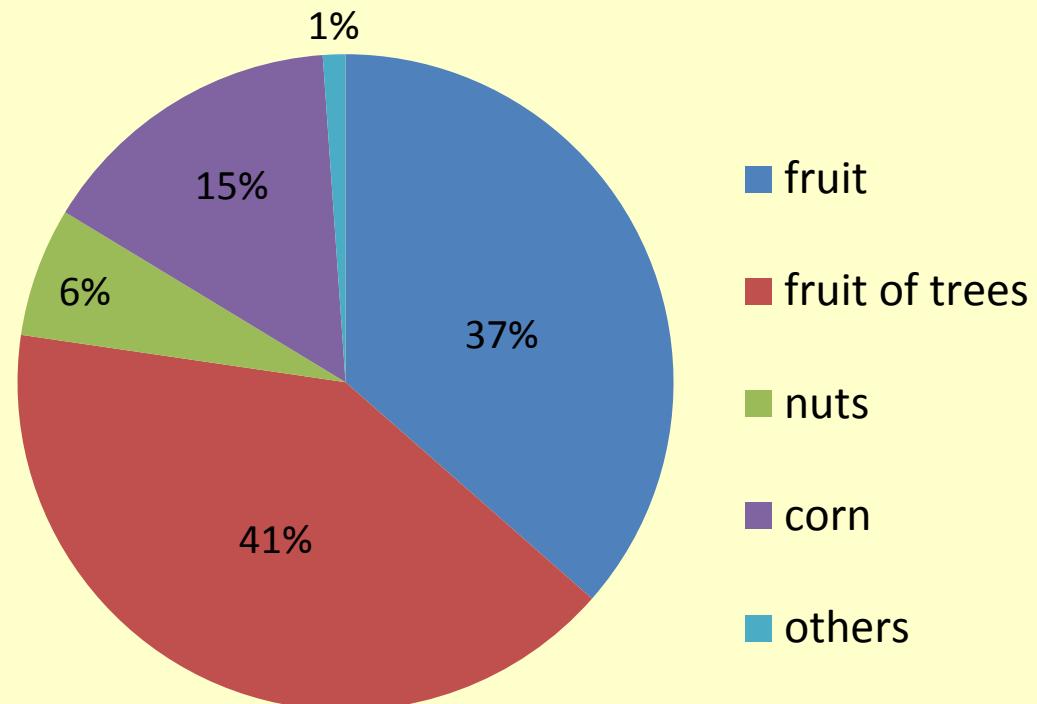
■ earthworms



„Projekt Waschbär“ – feeding ecology



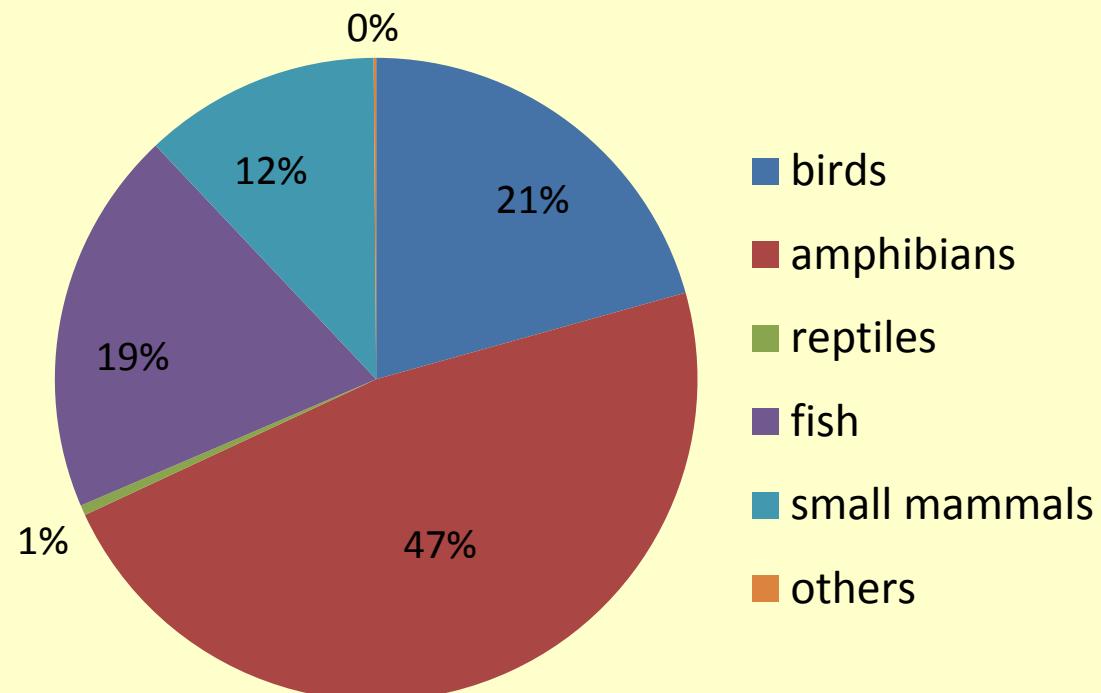
plants (n = 961; 34 %)



„Projekt Waschbär“ – feeding ecology



vertebrates (n = 613; 22 %)



„Projekt Waschbär“ – feeding ecology

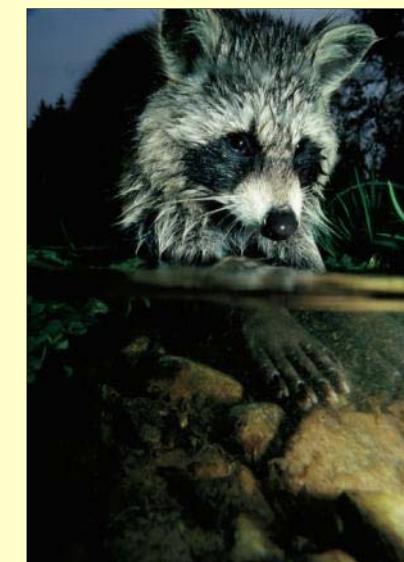


- raccoons are omnivorous and have opportunistic dietary behaviour

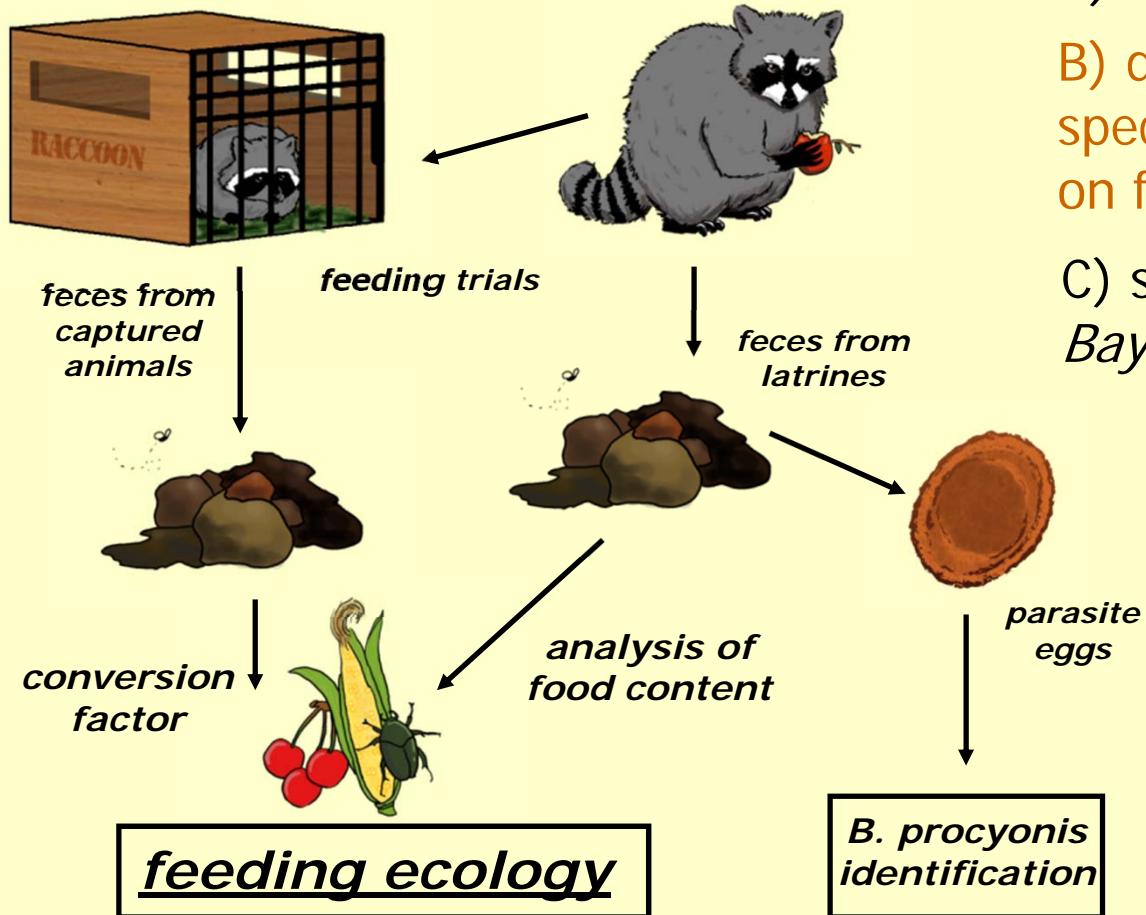
→ *they can easily adapt to the local range of available food*



- raccoons are very variable in their diet but prefer food within wetland habitats and food which is easily available in large amounts



„Projekt Waschbär“ – feeding ecology



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n=1285 fecal samples

„Projekt Waschbär“ – feeding ecology



conversion factor: proportion of fresh weight of food and the dry weight of the faeces

- how much of the food is finally defecated?
- specific value will be a factor in the calculation of the biomass



Feeding trials with encountered animals

- 2 periods: summer & autumn – feeding of 15 different components (concurrent with the food in the wild)

„Projekt Waschbär“ – feeding ecology



sample calculation for molluscs:

determined biomass in the sample = 25 %



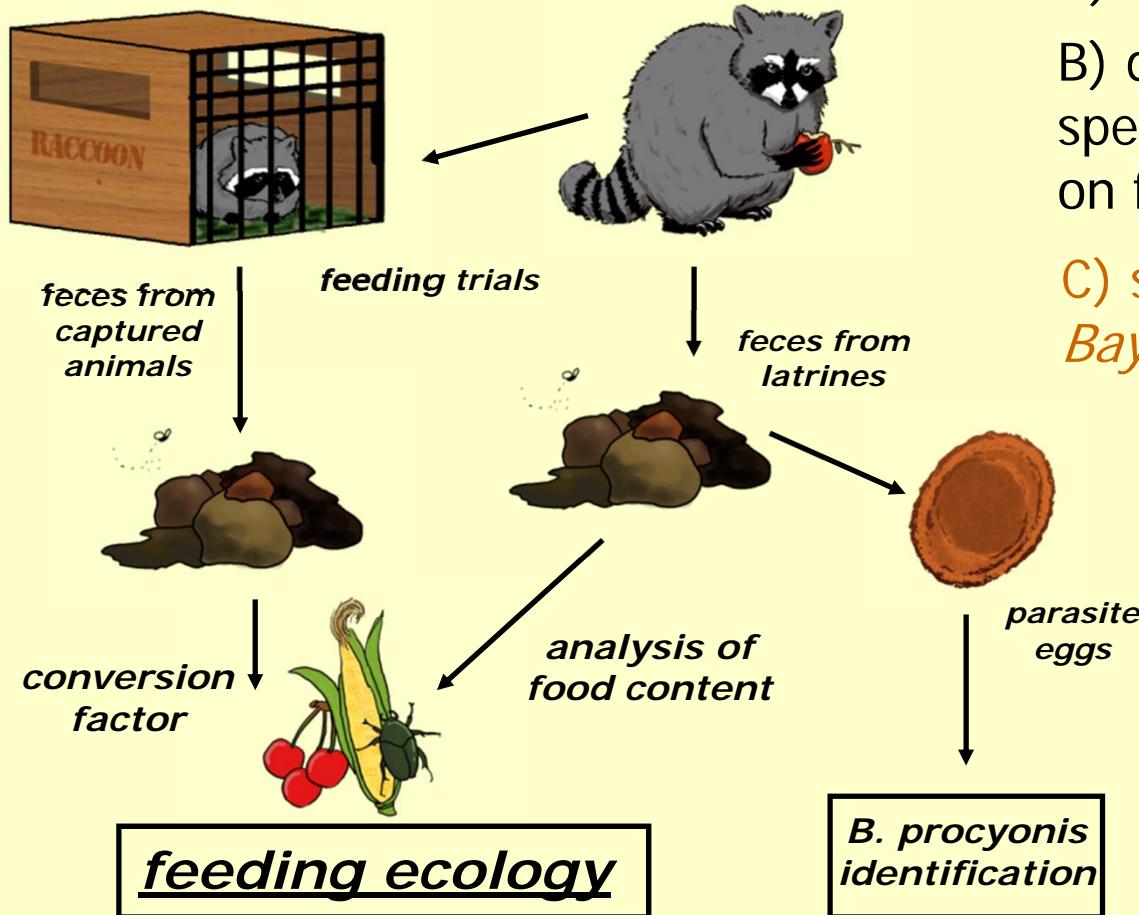
→ dry mass = 3,9 g

→
 $\times 4,74$ (*calculated
conversion factor*)



→ corrected biomass
(freshly consumed) = 18,49 g

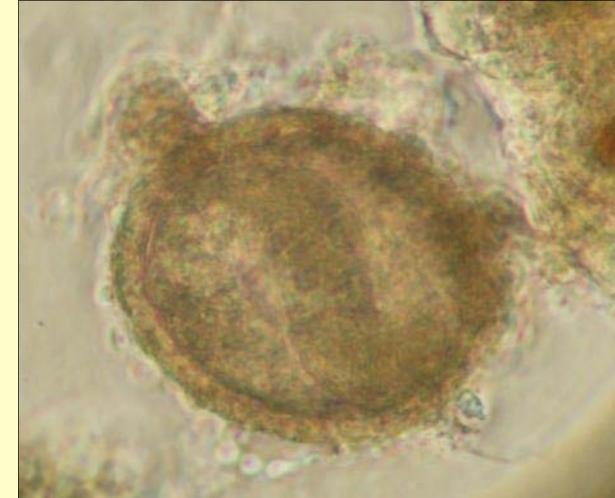
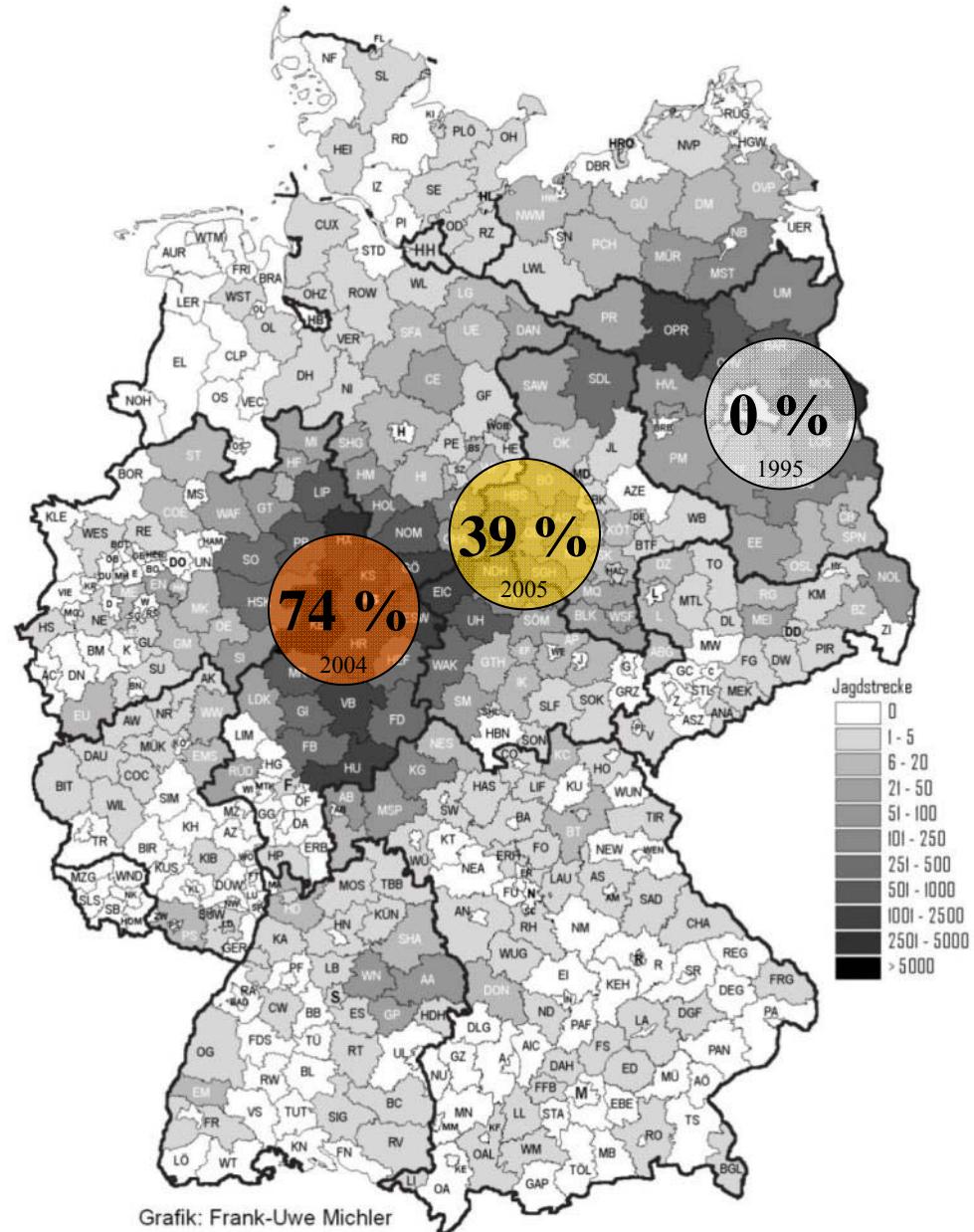
„Projekt Waschbär“ – doctoral thesis



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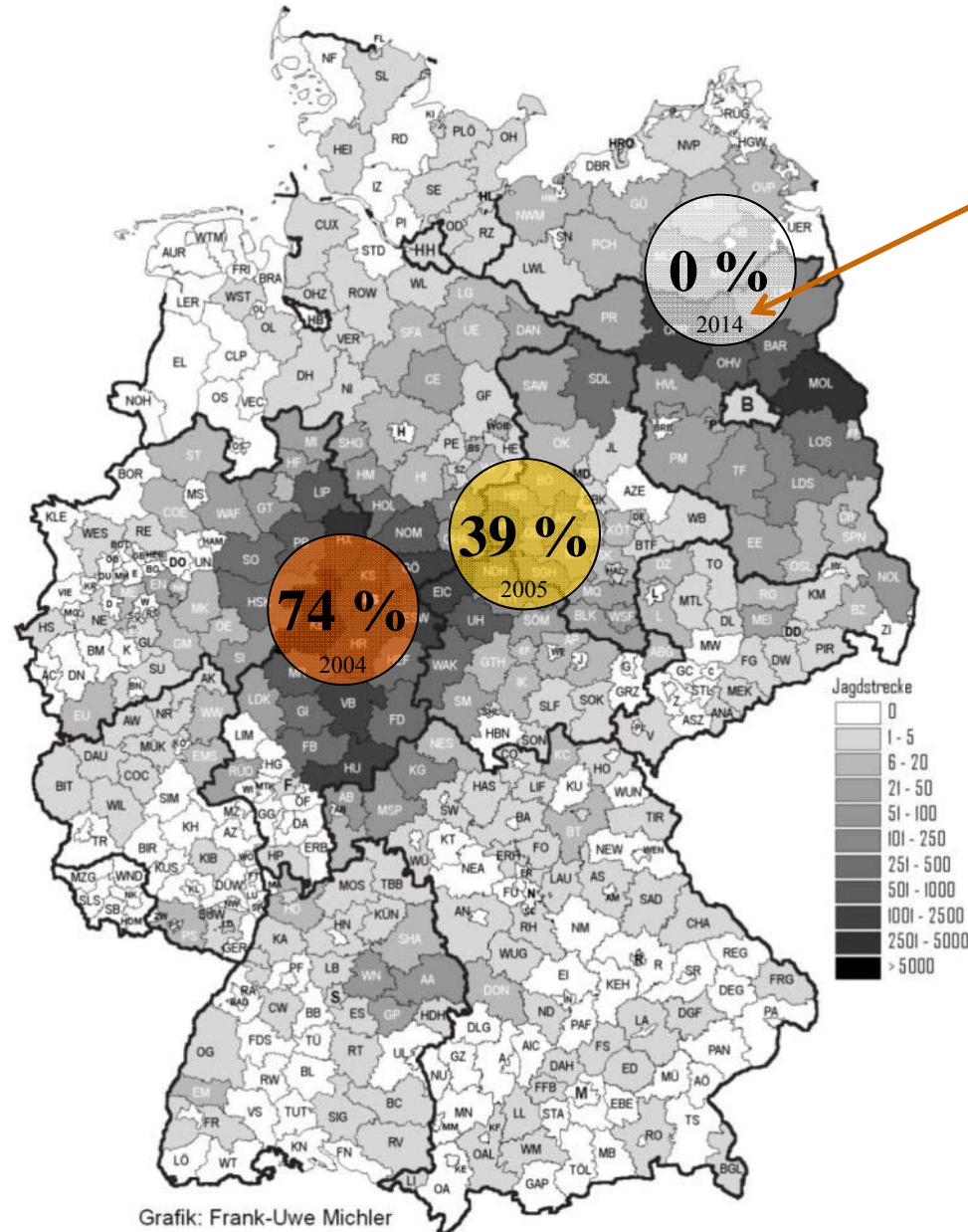
„Projekt Waschbär“ – parasitology



microscope image of an infectious
Baylisascaris procyonis egg (size 50 µm)

Lux & Priemer 1995
Gey 1998
Gunnesch 2004
Winter 2005

„Projekt Waschbär“ – parasitology



current investigation
from n=400 faeces
samples from the
Müritz National Park



Lux & Priemer 1995
Gey 1998
Gunnesch 2004
Winter 2005

Current situation



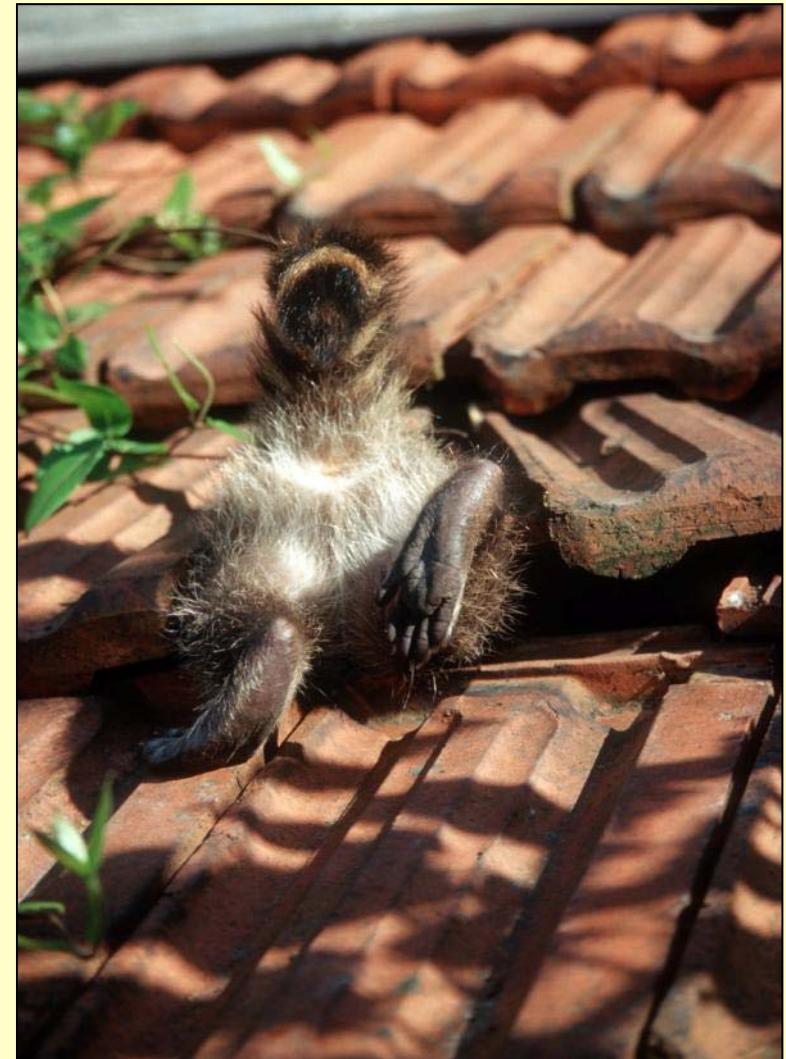
- economic effects
- hygienic relevance
- ecological effects



Current situation - economic effects



- occasionally costly damages to private house and garden

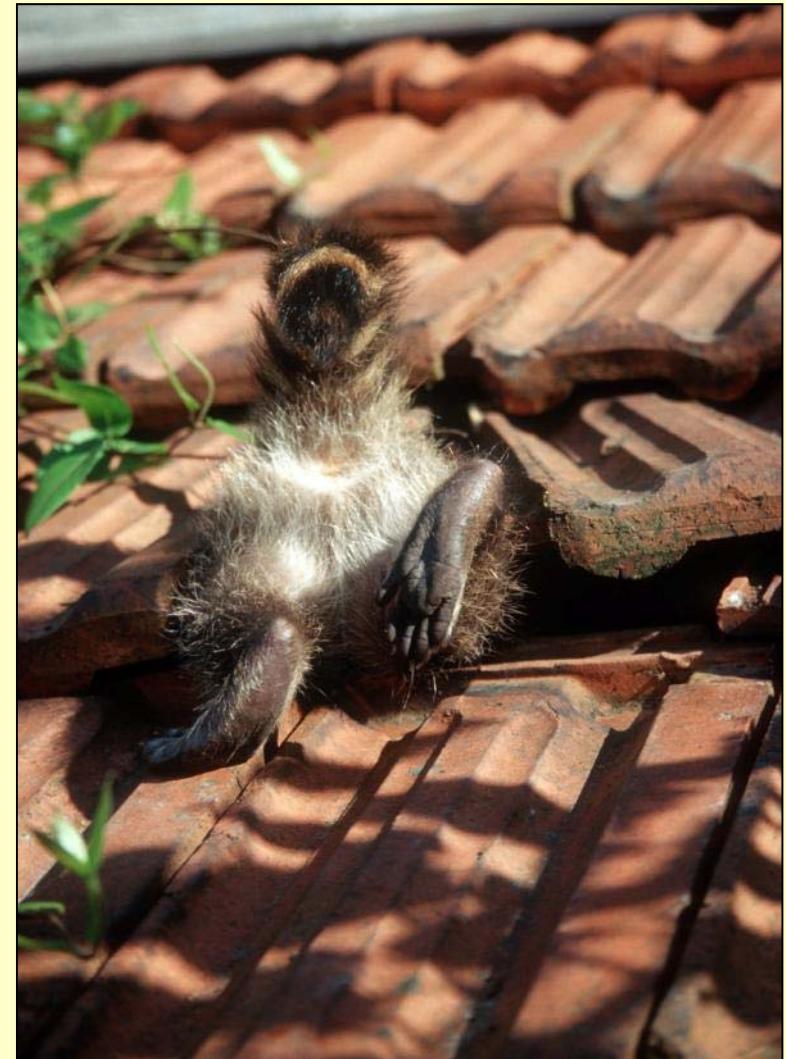


Current situation - economic effects



- occasionally costly damages to private house and garden

→ *no appreciable economic effects* (e.g. crop damages)



Current situation - hygienic relevance



epidemiological status in Europe:

- no host animal for *fox tapeworm* and *trichina*
- does not play a major role in the european epidemiology of *rabies* (VOSS et al. 2012)
- no important vector of *scabies*
- can be a carrier of *canine distemper viruses (CDV)* (Rentería-Solís et al. 2014)
- only known considerable zoonosis: *raccoon roundworm*



Current situation - hygienic relevance



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→ *low estimated epidemiologically risk in Germany*



Current situation – ecological effects

- so far no serious predation pressure verifiable
- a threat of autochthonous species is not looming ahead
- local negative effects, especially in suboptimal habitats, can not be ruled out



Current situation - ecological effects



- so far no serious predation pressure verifiable
- a threat of autochthonous species is not looming ahead
- local negative effects, especially in suboptimal habitats, can not be ruled out

→ *all current scientific studies indicate no serious ecological impact for close to nature habitat*



„Projekt Waschbär“ – prospects



- research will be finished in 2016
- currently 3 sub-projects in process



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The screenshot shows the homepage of the Projekt Waschbär website. At the top, there is a navigation bar with links to 'Waschbärenforschung im Müritz-Nationalpark', 'Kontakt/Ansprechpartner', 'Impressum', and 'Sitemap'. Below the navigation is a large banner image of a raccoon sitting on a tree branch. To the left of the banner is a sidebar with a navigation menu:

- Aktuelles
- Projekträger
- Projektziele
- Kurzbeschreibung des Projektes
- Forschungsschwerpunkte
- Arbeitsstand des Projektes
- Ergebnisse
- Publikationen
- Stand der Wissenschaft
- Presseinformationen/Pressespiegel
- Förderer und Sponsoren
- Online spenden
- Links/Literatur
- Kontakt/Ansprechpartner
- Projektmitarbeiter

Below the sidebar is a search bar with a 'Suche' input field and a 'Finden' button. A section titled 'Ihre Hilfe ist gefragt:' contains a link to 'Online spenden'.

The main content area features a large image of a raccoon on a branch, with the text 'PROJEKT WASCHBÄR' and 'Wildtierforschung im Müritz-Nationalpark'. Below this are three smaller images showing a raccoon, two people with a raccoon, and a close-up of a raccoon's ear. The text below the main image reads: 'Seit März 2006 untersucht ein junges Team aus Wildbiologen im Rahmen eines mehrjährigen Forschungsprojektes die Lebensweise des Waschbären (*Procyon lotor* Linne, 1758) im Serrahner Teilgebiet des Müritz-Nationalparks (Mecklenburg-Vorpommern, Deutschland).'

At the bottom of the page, there is an advertisement for 'Unterwegs' with the text: 'Natur erleben – das macht Spaß mit der richtigen Outdoorbekleidung. Große Auswahl an Bekleidung, Schuhen, Rucksäcken uvm. Versand frei ab 35 Euro!'. There is also a link: 'Sie haben einen mit Ohrmarken markierten Waschbären aufgefunden? Klicken Sie bitte [hier](#).'



I. Bartussek

Thank you
for your attention