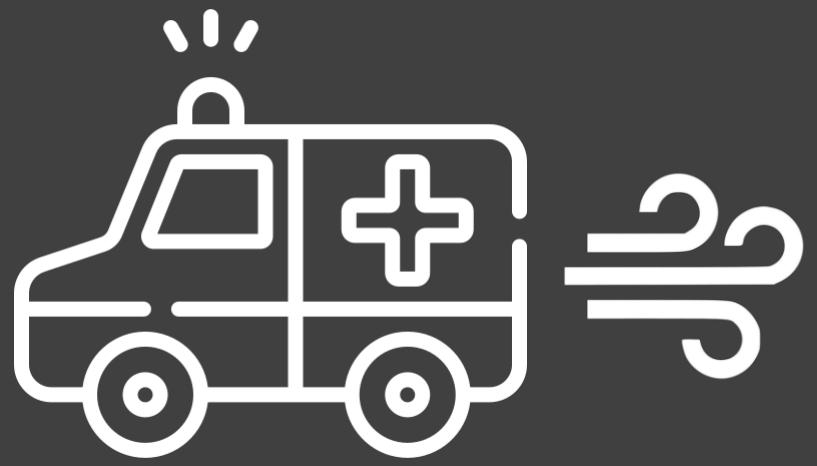
Interannueller Vergleich der Körperkondition von Erdkröten im Steigerwald von Erfurt

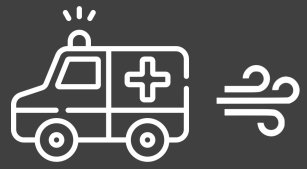
Konrad Kürbis, Tommy Ellmer & Ulrich Scheidet

15. Februar 2025
Jahrestagung Landesarbeitskreis Feldherpetologie Sachsen-Anhalt

Exkurs

Viele Gefährdungsfaktoren und Stressoren





Exkurs

Viele Gefährdungsfaktoren und Stressoren

Der globale Rückgang der Amphibienarten betrifft heute auch die weit verbreiteten und häufigen Arten.

Andreas Zahn, Udo Pankratius, Bernhard Pellkofer und Bernhard Hoiß

Bye, bye Grasfrosch? Klimabedingte, dramatische Bestandsabnahme in Bayern

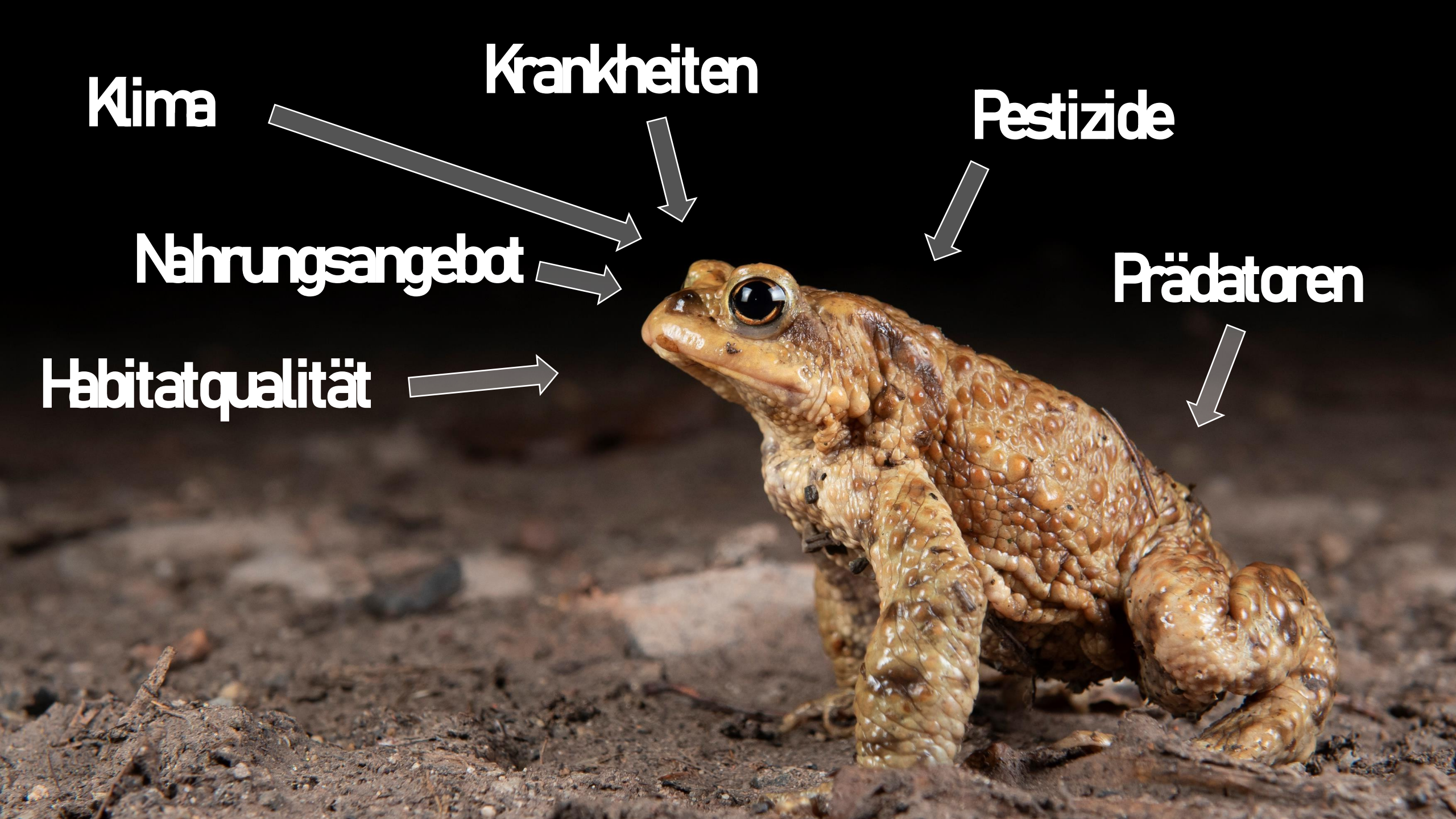
Abbildung 1
Grasfrösche im Laichgewässer (Foto: Udo Pankratius).

Der Grasfrosch *(Rana temporaria)* war bisher in Bayern sehr häufig. Aktuell mehren sich Meldungen auffälliger Bestandsabnahmen. Wir haben daher vorliegende und neu erhobene Daten zu Grasfroschvorkommen analysiert. Von drei Regionen liegen größere Datensätze vor: Aischgrund (Mittelfranken), Dingolfing-Landau (Niederbayern) und Mühldorf (Oberbayern). In diesen Regionen sind in den letzten 20 Jahren 100 %, 92 % beziehungsweise 91 % der Grasfroschbestände zurückgegangen oder erloschen, die Abnahme der Laichballenzahl betrug 100 %, 87 % beziehungsweise 78 %. Die Abnahme war am stärksten in der wärmsten und trockensten Region. Bestände in niederschlagsreichen Gebieten Bayerns scheinen hingegen stabil zu sein. Aufgrund unserer Auswertungen von Temperatur und Niederschlagsdaten sehen wir die Klimaänderung als wahrscheinliche Ursache für den Rückgang an und plädieren für eine systematische, bayernweite Erfassung der Situation des Grasfrosches sowie für Maßnahmen zur Bestandsstützung.

Einführung

Der Grasfrosch *(Rana temporaria)* gilt als eine der häufigsten Amphibienarten in Bayern (Sachteleben & Hansbauer 2019). Zwar ist aufgrund umfangreicher Landschaftsveränderungen von einem erheblichen Rückgang der Art in der Mitte des letzten Jahrhunderts auszugehen (Wagensonner & Zahn 2019), doch im Zeitraum von 1980 bis 2014 galten seine Bestände bayernweit als stabil oder allenfalls leicht abnehmend (Sachteleben & Zahn 2019). Ab etwa 2016 mehrten sich jedoch Meldungen


Klima
Krankheiten
Pestizide
Nahrungsangebot
Prädatoren
Habitatqualität


Klima
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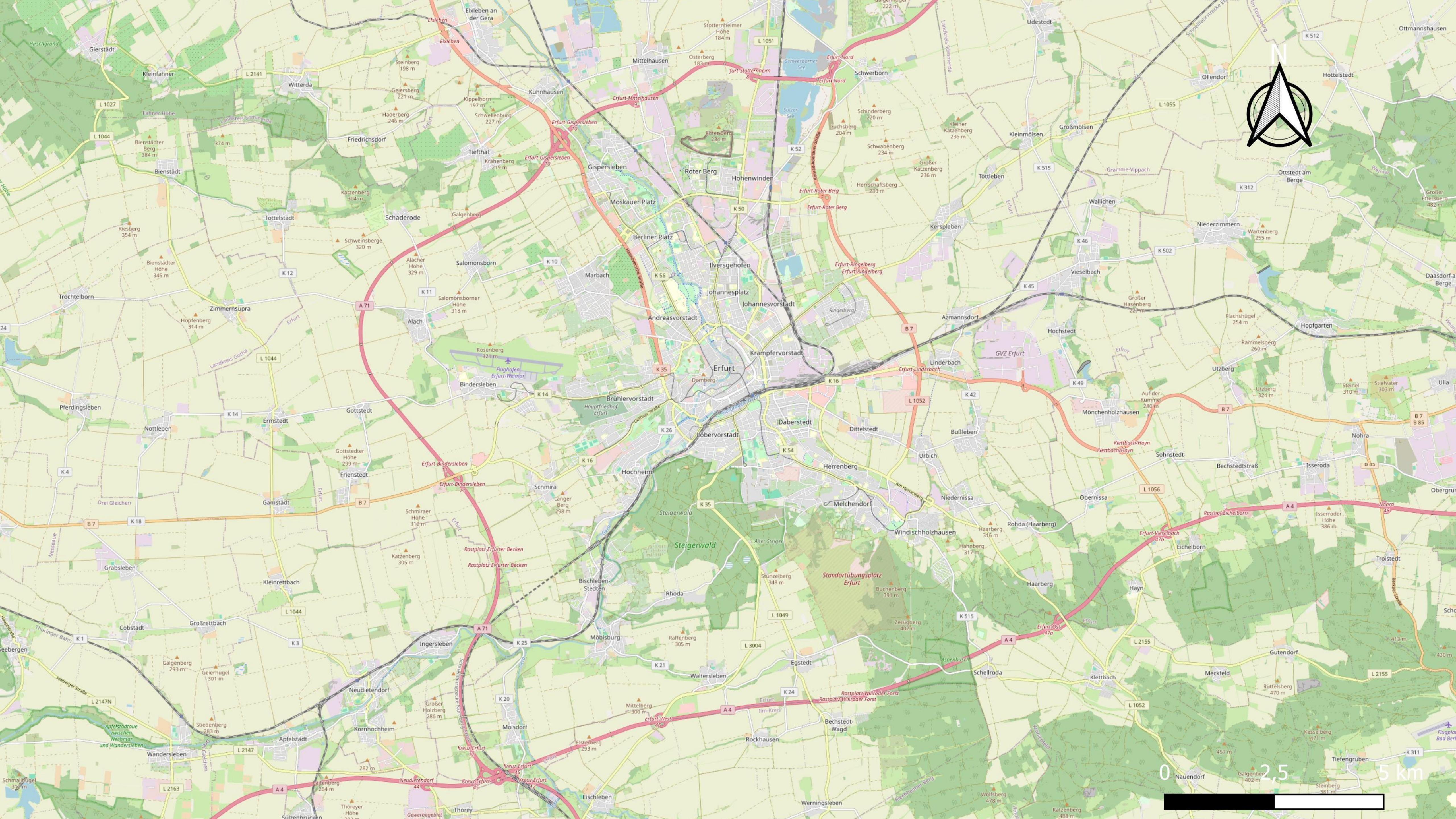
Prädatoren
Habitatqualität

Untersuchungsgebiet



N
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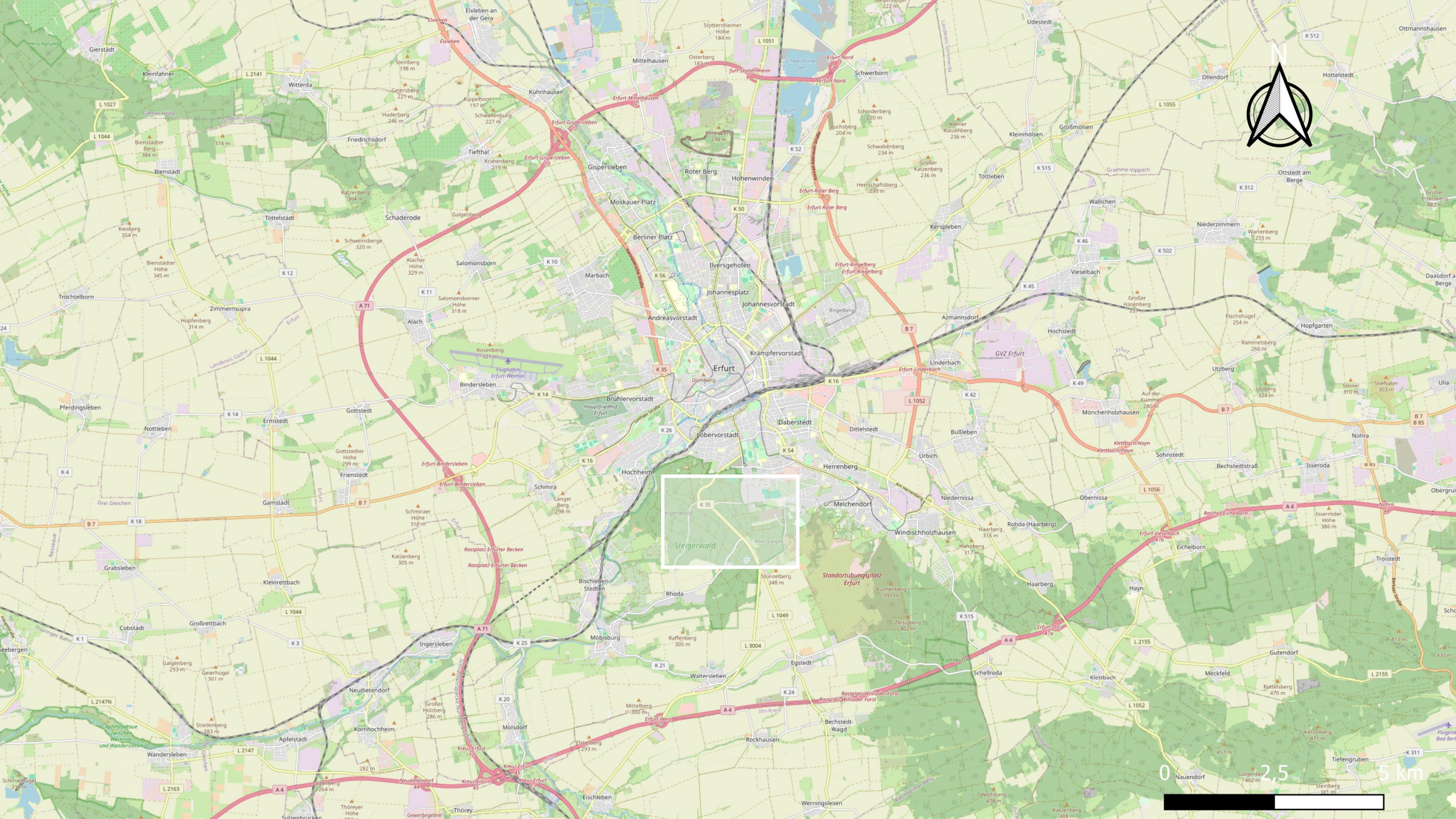
5 km
Erfurt
Domberg
Andreasvorstadt
Johannesplatz
Johannesvorstadt
Krämpfervorstadt
Ilversgehofen
Berliner Platz
Moskauer Platz
Gispersleben
Roter Berg
Hohenwinden
Marbach
Brühlervorstadt
Löbervorstadt
Daberstedt
Hochheim
Herrenberg
Melchendorf
Windischholzhausen
Steigerwald
Hauptfriedhof Erfurt
Flughafen Erfurt-Weimar
Rosenberg 321 m
Bindersleben
Alach
Salomonsborn
Schaderode
Tiefthal
Kühnhausen
Mittelhausen
Elxleben an der Gera
Witterda
Kleinfahner
Gierstädt
Friedrichsdorf
Bienstädt
Töttelstädt
Trochtelborn
Zimmernsupra
Pferdingsleben
Nottleben
Ermstedt
Gottstedt
Frienstedt
Gamstädt
Schmira
Grabsleben
Kleinrettbach
Cobstädt
Großrettbach
Seebergen
Ingersleben
Neudietendorf
Apfelstädt
Wandersleben
Kornhochheim
Molsdorf
Möbisburg
Bischleben-Stedten
Rhoda
Waltersleben
Egstedt
Bechstedt-Wagd
Rockhausen
Eischleben
Thörey
Sulzenbrücken
Werningsleben
Schellroda
Klettbach
Meckfeld
Gutendorf
Hayn
Haarberg
Rohda (Haarberg)
Niedernissa
Urbich
Büßleben
Dittelstedt
Linderbach
Azmannsdorf
Hochstedt
Mönchenholzhausen
Sohnstedt
Obernissa
Eichelborn
Troistedt
Bechstedtstraß
Isseroda
Nohra
Utzberg
Hopfgarten
Vieselbach
Niederzimmern
Wallichen
Kerspleben
Töttleben
Kleinmölsen
Großmölsen
Udestedt
Ollendorf
Hottelstedt
Ottmannshausen
Ottstedt am Berge
Schwerborn
Schwerborner See
Sulzer See
GVZ Erfurt
Standortübungsplatz Erfurt
Nauendorf
Tiefengruben
A 71
A 4
B 7
L 1052
L 1049
L 3004
L 1044
L 1056
L 2155
K 35
K 16
K 14
Erfurt-Nord
Erfurt-Gispersleben
Erfurt-Mittelhausen
Erfurt-Roter Berg
Erfurt-Ringelberg
Erfurt-Linderbach
Erfurt-Bindersleben
Erfurt-West
Erfurt-Ost
Erfurt-Vieselbach
Kreuz Erfurt
Klettbach/Hayn
Rastplatz Erfurter Becken
Rastplatz Willroder Forst
Landkreis Gotha
Landkreis Sömmerda
Ilm-Kreis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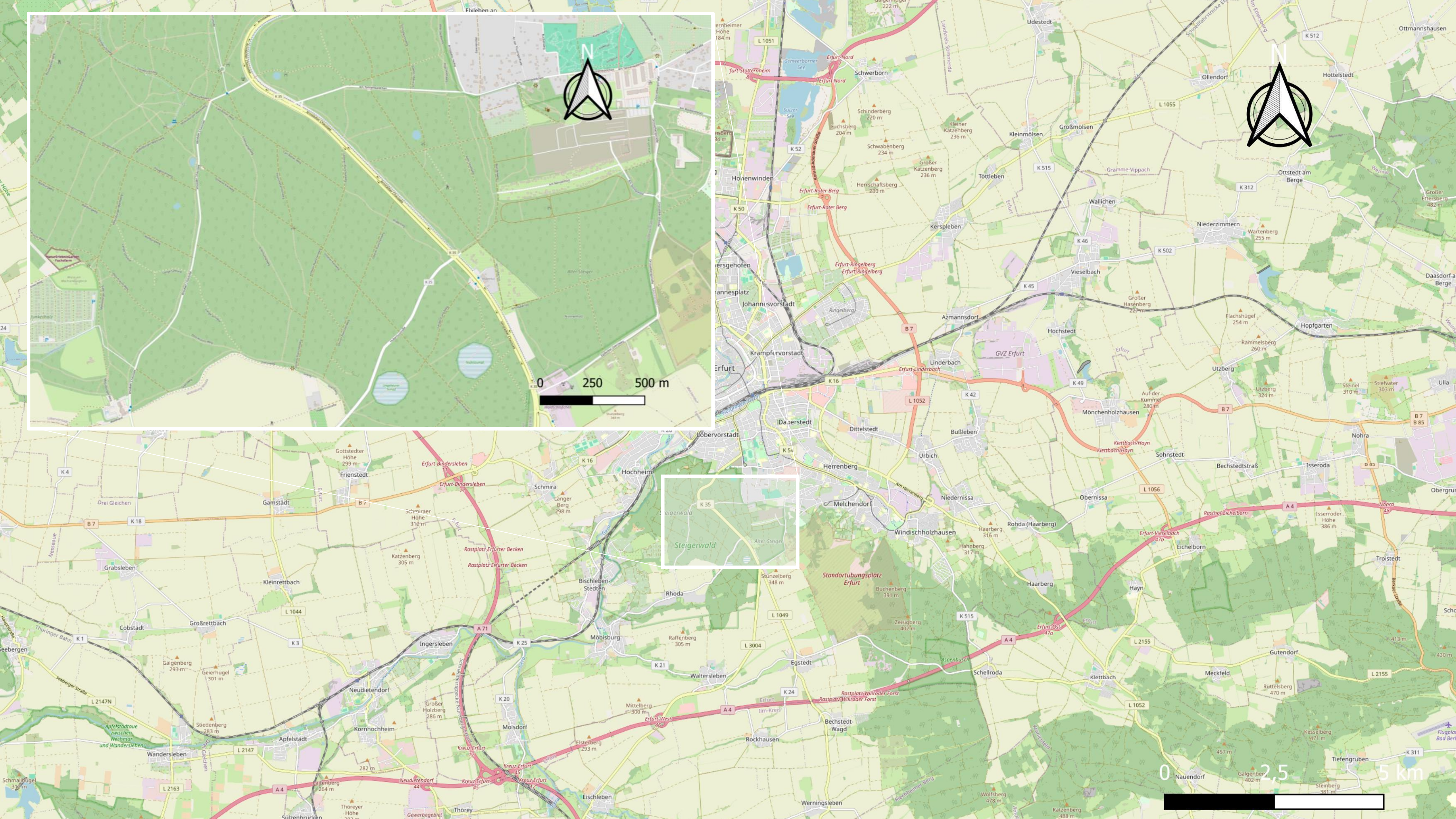
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Erfurt
Krämpfervorstadt
Johannesvorstadt
Daberstedt
Löbervorstadt
Hochheim
Herrenberg
Melchendorf
Windischholzhausen
Steigerwald
Standortübungsplatz Erfurt
GVZ Erfurt
Schwerborn
Hohenwinden
Kerspleben
Vieselbach
Azmannsdorf
Linderbach
Hochstedt
Mönchenholzhausen
Dittelstedt
Büßleben
Urbich
Niedernissa
Rohda (Haarberg)
Egstedt
Waltersleben
Möbisburg
Rhoda
Bischleben-Stedten
Schmira
Frienstedt
Gamstädt
Kleinrettbach
Großrettbach
Grabsleben
Cobstädt
Ingersleben
Neudietendorf
Apfelstädt
Kornhochheim
Molsdorf
Wandersleben
Eischleben
Rockhausen
Bechstedt-Wagd
Werningsleben
Schellroda
Klettbach
Hayn
Haarberg
Eichelborn
Obernissa
Sohnstedt
Bechstedtstraß
Isseroda
Nohra
Utzberg
Hopfgarten
Niederzimmern
Ollendorf
Udestedt
Kleinmölsen
Großmölsen
Töttleben
Wallichen
Ottstedt am Berge
Hottelstedt
Ottmannshausen
Troistedt
Gutendorf
Meckfeld
Tiefengruben
Nauendorf
Thörey
Sulzenbrücken
Stunzelberg 348 m
Buchenberg 391 m
Zeisigberg 402 m
Katzenberg 305 m
Galgenberg 293 m
Geierhügel 301 m
Raffenberg 305 m
Mittelberg 300 m
Elsterberg 293 m
Stiedenberg 283 m
Langer Berg 298 m
Schmiraer Höhe 312 m
Gottstedter Höhe 299 m
Haarberg 316 m
Hahnberg 317 m
Rastplatz Erfurter Becken
Rastplatz Willroder Forst
Erfurt-Bindersleben
Erfurt-West
Erfurt-Ost
Erfurt-Vieselbach
Erfurt-Linderbach
Erfurt-Ringelberg
Erfurt-Roter Berg
Erfurt-Nord
Kreuz Erfurt
A 71
A 4
B 7
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L 1049
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L 2155
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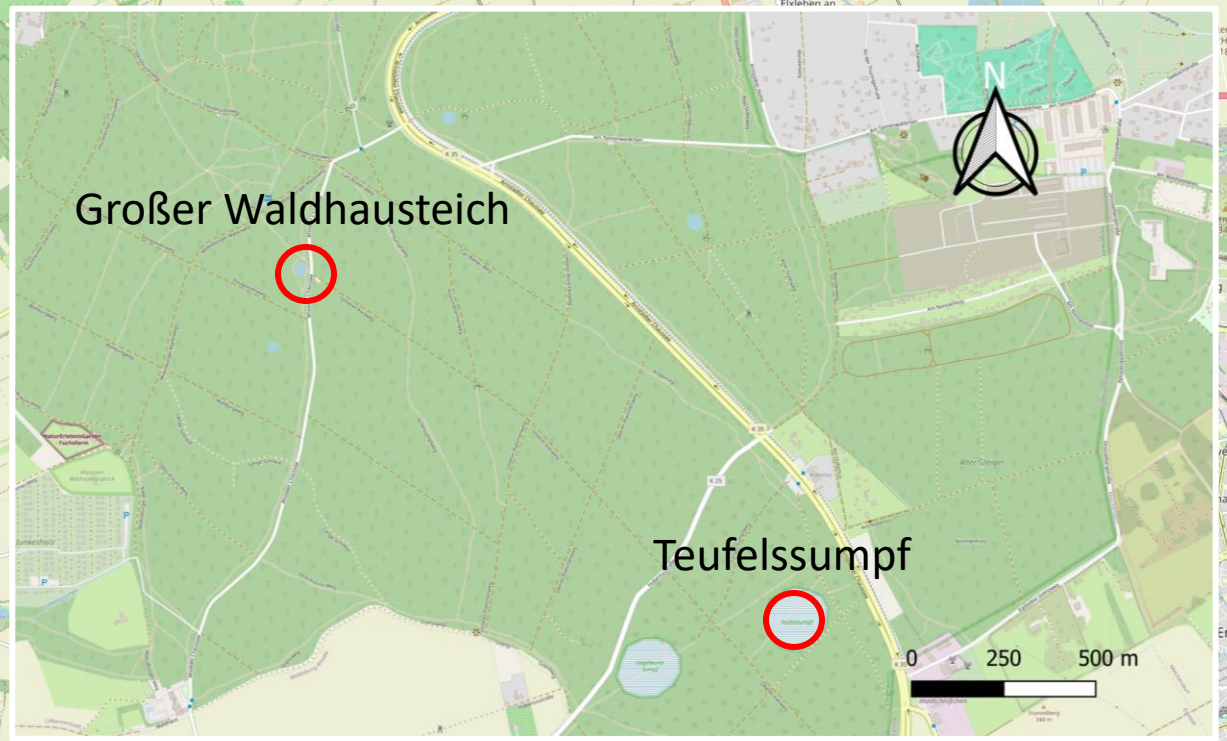
L 1055
Orei Gleichen


Großer Waldhausteich
Teufelssumpf
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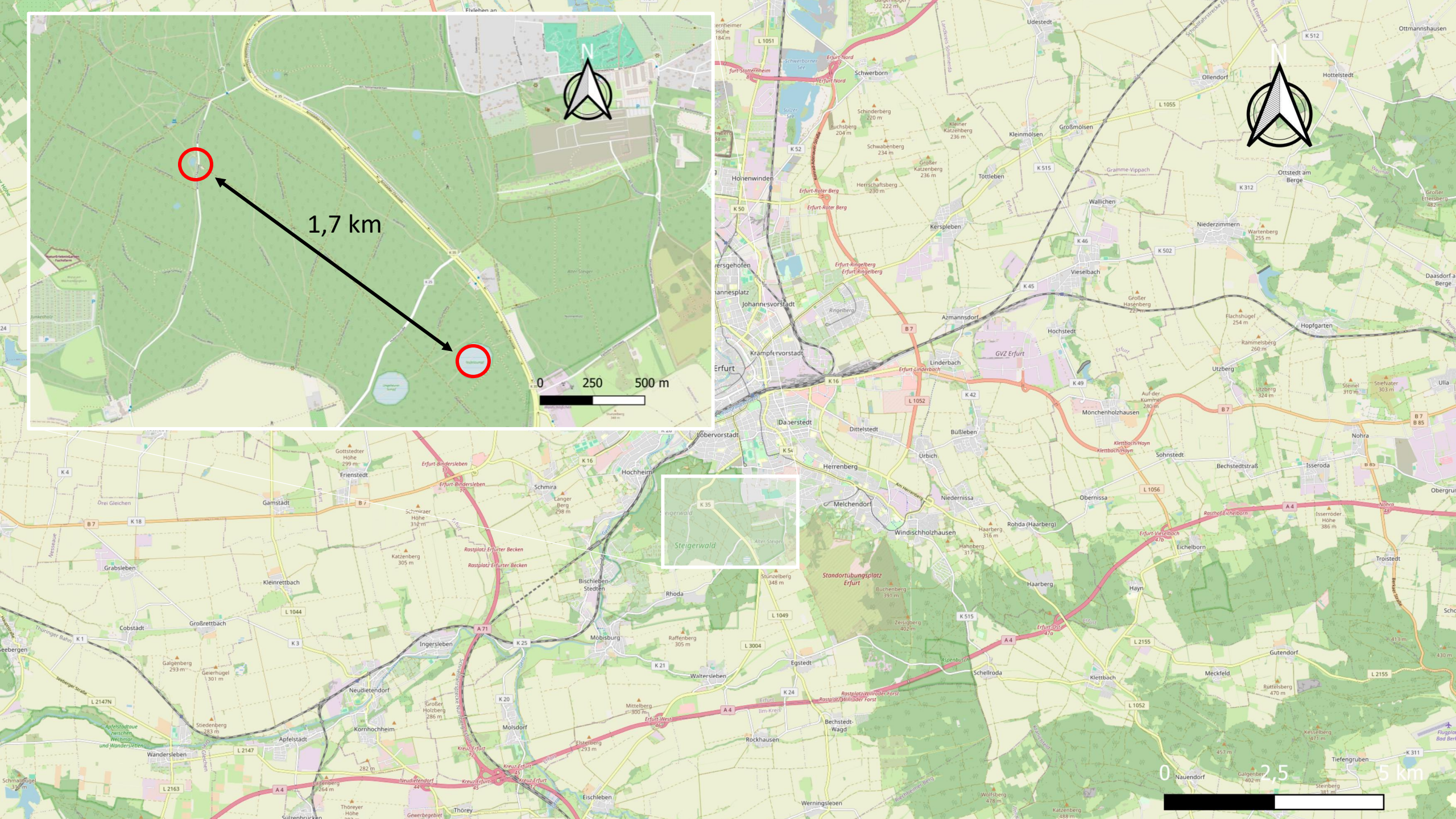
2,5
5 km


1,7 km
N
0
250
500 m
Steigerwald
0
2,5
5 km

Datengrundlage

Datengrundlage

1986 – 1988*	2021	2024
5.038 ♂♂**	60 ♂♂	283 ♂♂

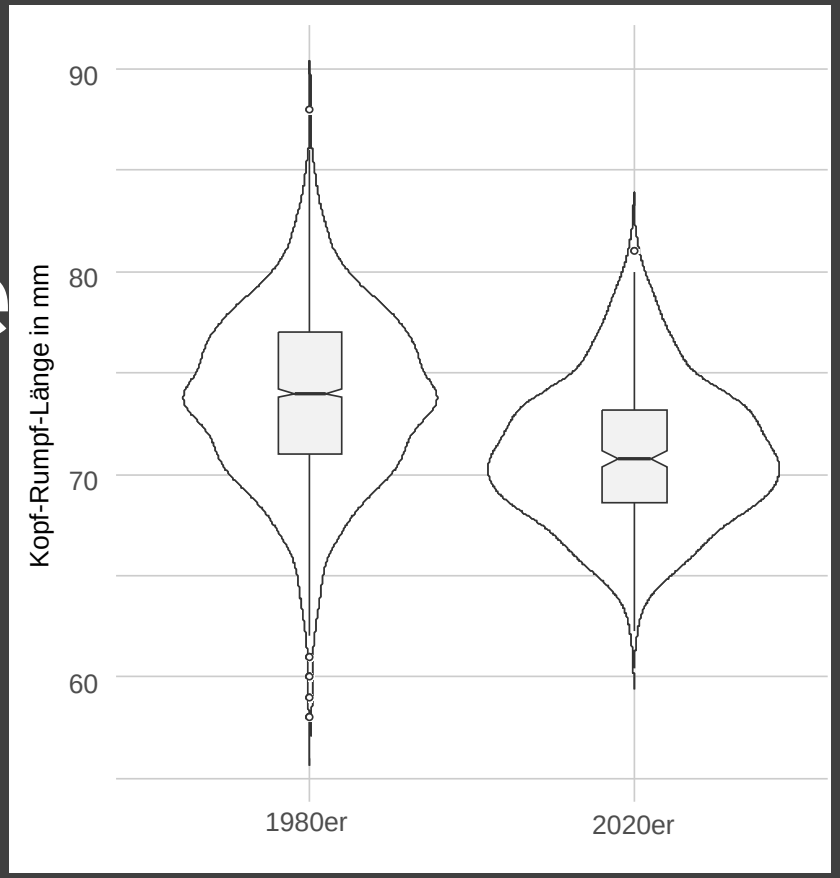
* Scheidt, U (1991): Frühjahrswanderung und Dynamik einer Population der Erdkröte *Bufo bufo* (L., 1758) im Landschaftsschutzgebiet „Steigerwald" bei Erfurt/Thür.

** Für 3.405 Individuen liegen neben der Kopf-Rumpf-Länge (KRL) auch Angaben zum Körpergewicht (m) vor.

Ergebnisse

Ergebnisse

Vergleich Kopf-Rumpf-Länge

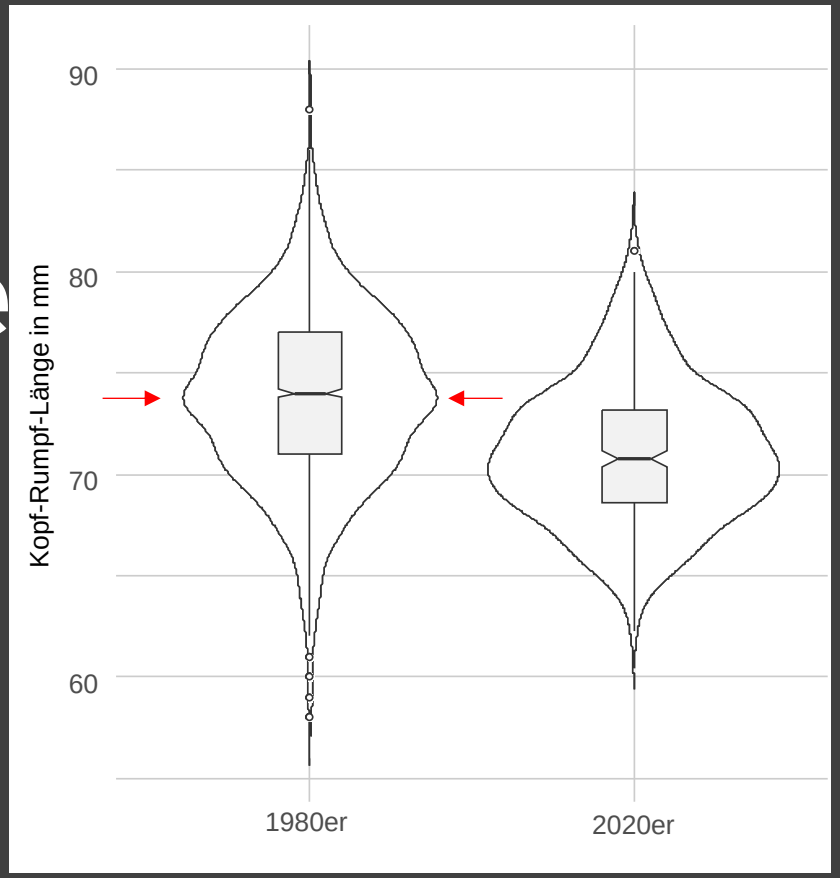


Ergebnisse

Vergleich Kopf-Rumpf-Länge

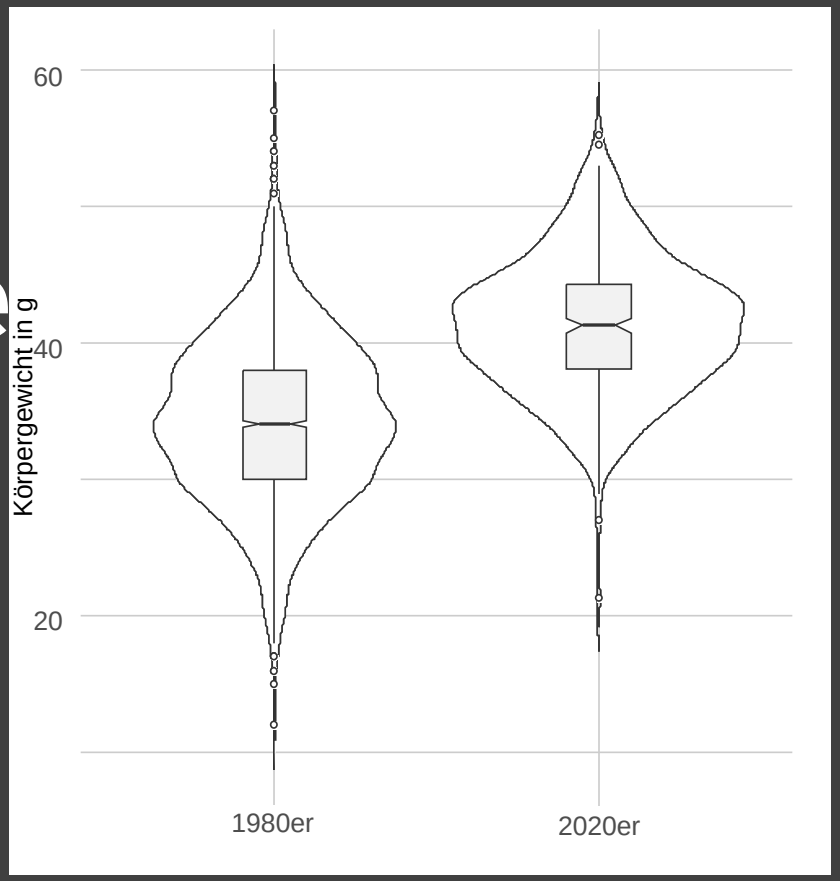
Ergebnisse

Vergleich Kopf-Rumpf-Länge



Ergebnisse

Vergleich Körpergewicht



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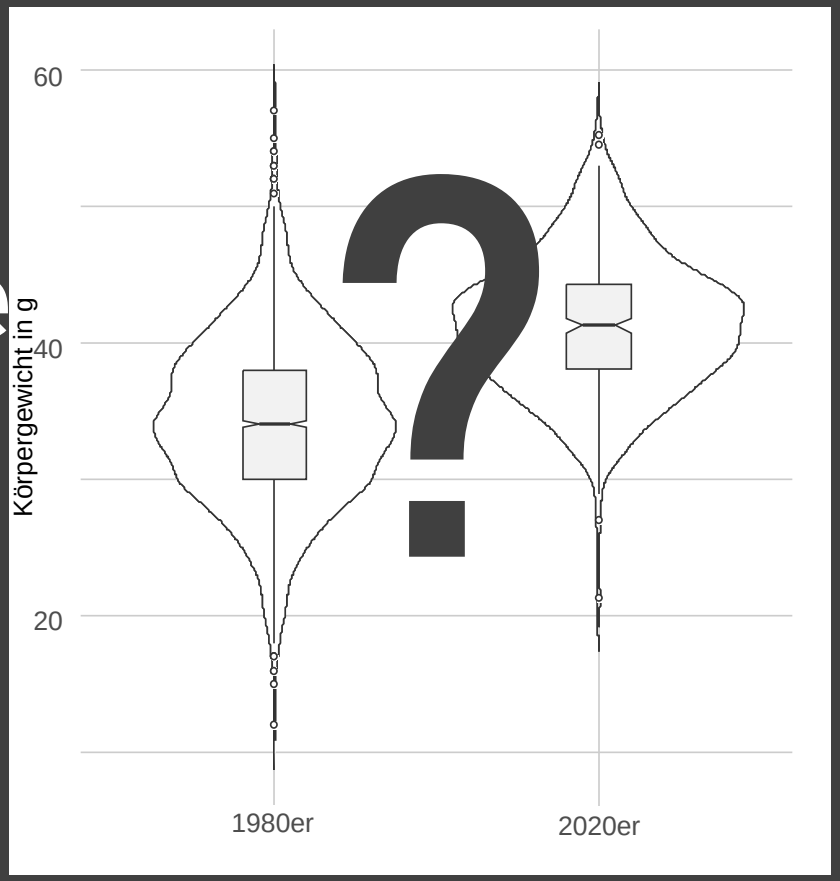
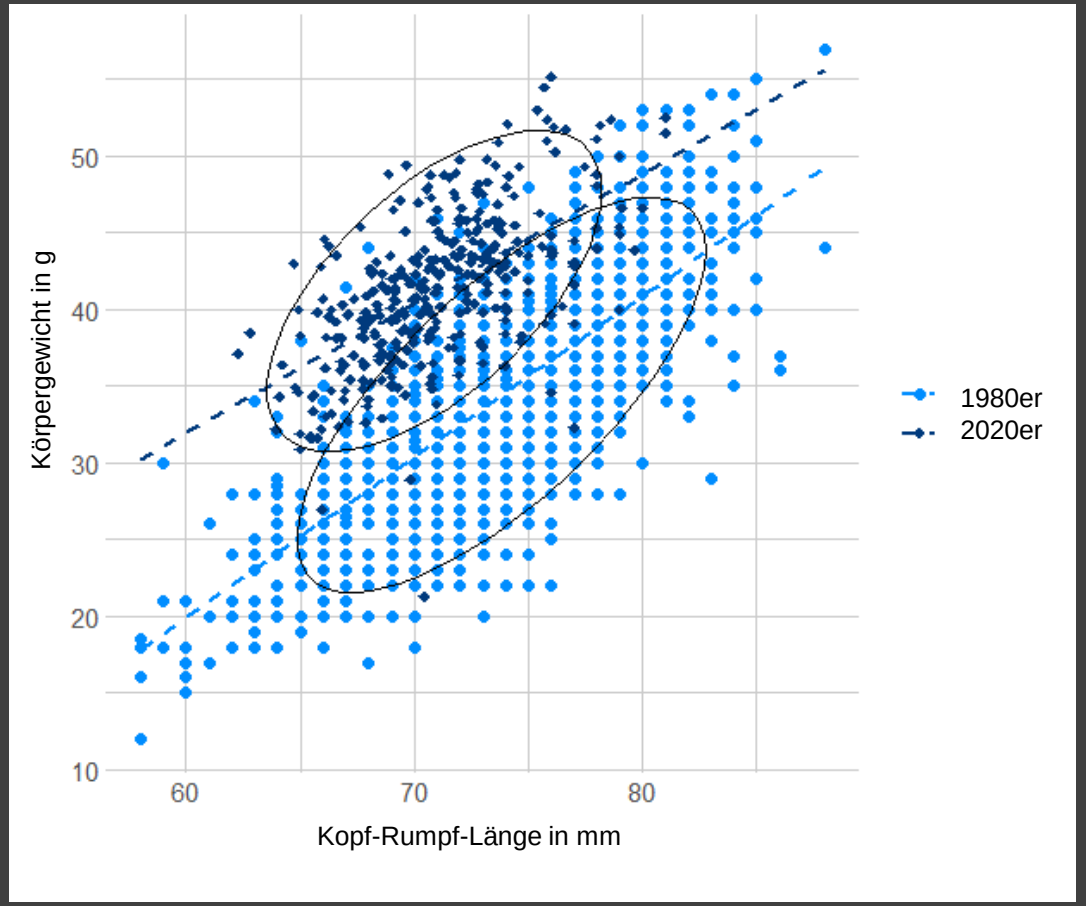


Vergleich Körpergewicht

Ergebnisse


Körpergewicht in g
50
40
30
20
10
60
70
80
Kopf-Rumpf-Länge in mm
1980er
2020er

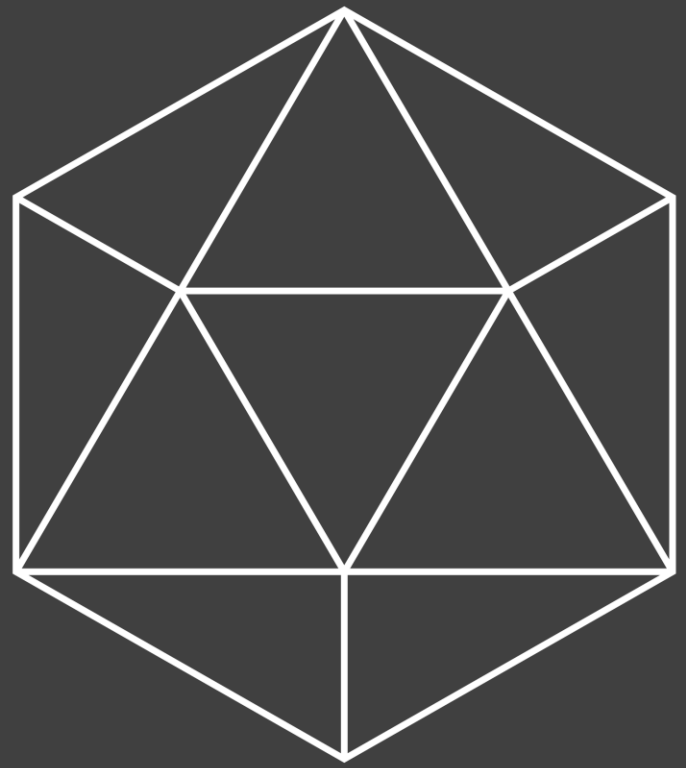
Bufonid herpesvirus 1

Bufonid herpesvirus 1

Familie: Alloherpesviridae

DNA-Virus

Ikosaedrische Symmetrie (Ø 80 nm)



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Bufonid herpesvirus 1 (BfHV1) associated dermatitis and mortality in free ranging common toads (*Bufo bufo*) in Switzerland

Received: 19 January 2018
Accepted: 17 September 2018
Published online: 03 October 2018

Francesco C. Origgi[1], Benedikt R. Schmidt[2,3], Petra Lohmann[4], Patricia Otten[5], Roman K. Meier[1], Simone R. R. Pisano[1], Gaia Moore-Jones[1], Marco Tecilla[6], Ursula Sattler[1], Thomas Wahli[1], Veronique Gaschen[7] & Michael H. Stoffel[7]

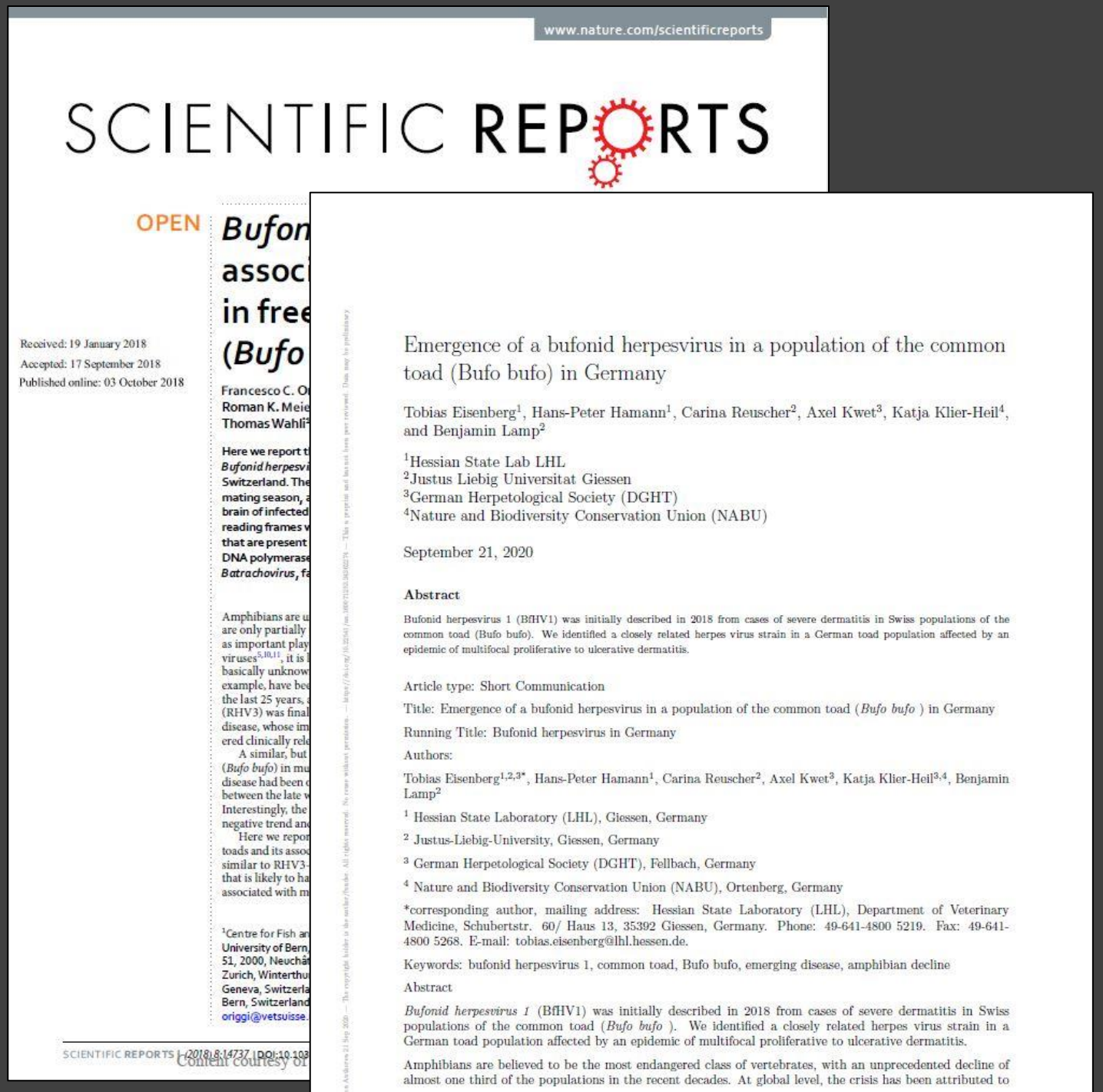
Here we report the discovery and partial characterization of a novel herpesvirus tentatively named *Bufonid herpesvirus* 1 (BfHV1) from severe dermatitis in free ranging common toads (*Bufo bufo*) in Switzerland. The disease has been observed in toads every year since 2014, in spring, during the mating season, at different and distant locations. The virus is found in the skin and occasionally in the brain of infected toads. The genome of the virus is at least 158 Kb long and contains at least 152 open reading frames with a minimal length of 270 nt. The genome of BfHV1 contains all the signature genes that are present in alloherpesviruses. Phylogenetic analysis based on the amino acid sequence of the DNA polymerase and terminase proteins positions the novel virus among the members of the genus *Batrachovirus*, family *Alloherpesviridae*. This is the first herpesvirus ever characterized in common toads.

Amphibians are undergoing a major decline worldwide[1,2]. The reasons for this unprecedented loss in biodiversity are only partially understood[3]. Among potential contributors, infectious diseases have recently raised attention as important players[4,5]. In addition to well-characterized amphibian pathogens including chytrids[6–9] and ranaviruses[5,10,11], it is likely that other pathogens or putative pathogens, whose role in amphibian disease ecology is basically unknown, though not irrelevant, are still to be discovered and better investigated[12]. Herpesviruses for example, have been long known in frogs[13,14]; however, they still remain under-investigated. Accordingly, during the last 25 years, a herpesvirus was repeatedly observed in European frogs[12,15,16]. However, *Ranid herpesvirus* 3 (RHV3) was finally identified and characterized only recently[17]. This virus is associated with proliferative skin disease, whose impact on the affected frogs is unknown but given the severe and extensive skin lesions is considered clinically relevant.

A similar, but distinct proliferative skin disease has recently been observed in free-ranging common toads (*Bufo bufo*) in multiple regions of Switzerland including a location where a mass mortality event occurred. The disease had been observed by us since 2014; after volunteers patrolling amphibian migrations to the breeding sites between the late winter and early spring reported that about 10% of the observed toad populations were affected. Interestingly, the common toad populations both in Switzerland and in UK have been reported to undergo a negative trend and the reasons for this are currently unknown[18].

Here we report the results of a study aiming to partially characterize this emerging disease in free-ranging toads and its associated viral agent, tentatively named *Bufonid herpesvirus* 1 (BfHV1). This is another disease that, similar to RHV3-associated skin disease, may have been overlooked or underestimated in previous years, but that is likely to have been present in the free-ranging European common toad population and might have been associated with mortality.

[1]Centre for Fish and Wildlife Health (FIWI), Department of Infectious Diseases and Pathobiology, Vetsuisse Faculty, University of Bern, Länggassstrasse 122, 3001, Bern, Switzerland. [2]Info fauna Karch, UniMail, Batiment G, Bellevaux 51, 2000, Neuchâtel, Switzerland. [3]Department of Evolutionary Biology and Environmental Studies, University of Zurich, Winterthurerstrasse 190, 8057, Zurich, Switzerland. [4]Veterinarian, 8127, Forch, Switzerland. [5]Fasteris SA, Geneva, Switzerland. [6]University of Milan, Milan, Italy. [7]Division of Veterinary Anatomy, University of Bern, POB, Bern, Switzerland. Correspondence and requests for materials should be addressed to F.C.O. (email: francesco.origgi@vetsuisse.unibe.ch)



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Received: 19 January 2018
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Emergence of a bufonid herpesvirus in a population of the common toad (Bufo bufo) in Germany

Tobias Eisenberg[1], Hans-Peter Hamann[1], Carina Reuscher[2], Axel Kwet[3], Katja Klier-Heil[4], and Benjamin Lamp[2]

[1]Hessian State Lab LHL
[2]Justus Liebig Universitat Giessen
[3]German Herpetological Society (DGHT)
[4]Nature and Biodiversity Conservation Union (NABU)

September 21, 2020

Abstract

Bufonid herpesvirus 1 (BfHV1) was initially described in 2018 from cases of severe dermatitis in Swiss populations of the common toad (Bufo bufo). We identified a closely related herpes virus strain in a German toad population affected by an epidemic of multifocal proliferative to ulcerative dermatitis.

Article type: Short Communication

Title: Emergence of a bufonid herpesvirus in a population of the common toad (*Bufo bufo*) in Germany

Running Title: Bufonid herpesvirus in Germany

Authors:

Tobias Eisenberg[1,2,3*], Hans-Peter Hamann[1], Carina Reuscher[2], Axel Kwet[3], Katja Klier-Heil[3,4], Benjamin Lamp[2]

[1] Hessian State Laboratory (LHL), Giessen, Germany

[2] Justus-Liebig-University, Giessen, Germany

[3] German Herpetological Society (DGHT), Fellbach, Germany

[4] Nature and Biodiversity Conservation Union (NABU), Ortenberg, Germany

*corresponding author, mailing address: Hessian State Laboratory (LHL), Department of Veterinary Medicine, Schubertstr. 60/ Haus 13, 35392 Giessen, Germany. Phone: 49-641-4800 5219. Fax: 49-641-4800 5268. E-mail: tobias.eisenberg@lhl.hessen.de.

Keywords: bufonid herpesvirus 1, common toad, Bufo bufo, emerging disease, amphibian decline

Abstract

Bufonid herpesvirus 1 (BfHV1) was initially described in 2018 from cases of severe dermatitis in Swiss populations of the common toad (*Bufo bufo*). We identified a closely related herpes virus strain in a German toad population affected by an epidemic of multifocal proliferative to ulcerative dermatitis.

Amphibians are believed to be the most endangered class of vertebrates, with an unprecedented decline of almost one third of the populations in the recent decades. At global level, the crisis has been attributed to

Bufonid herpesvirus 1

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Accepted: 17 September 2018
Published online: 03 October 2018

Francesco C. O
Roman K. Meie
Thomas Wahli

Here we report t
Bufonid herpesvi
Switzerland. The
mating season, a
brain of infected
reading frames v
that are present
DNA polymerase
Batrachovirus, fa

Amphibians are u
are only partially
as important play
viruses[5,10,11], it is
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(RHV3) was final
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that is likely to ha
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[1]Centre for Fish an
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51, 2000, Neuchât
Zurich, Winterthu
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Bern, Switzerland
origgi@vetsuisse.

Emergence of a bufonid herpesvirus in a population of the common toad (Bufo bufo) in Germany

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and Benjamin Lamp[2]

[1]Hessian State Lab LHL
[2]Justus Liebig Universitat Giessen
[3]German Herpetological Society (DGHT)
[4]Nature and Biodiversity Conservation Unio

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[2] Justus-Liebig-University, Giessen, Germany

[3] German Herpetological Society (DGHT), Fellbach,

[4] Nature and Biodiversity Conservation Union (NAB

*corresponding author, mailing address: Hessian
Medicine, Schubertstr. 60/ Haus 13, 35392 Giesse
4800 5268. E-mail: tobias.eisenberg@lhl.hessen.de.

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Amphibians are believed to be the most endangered
almost one third of the populations in the recent de

Zeitschrift für Feldherpetologie 27: 209–216 Oktober 2021

Erstnachweis des *Bufonid herpesvirus* 1 (BfHV 1) in Thüringen

Konrad Kürbis[1] & Francesco C. Origgi[2]

[1]Naturkundemuseum Erfurt, Große Arche 14, D-99085 Erfurt, konrad.kuerbis@erfurt.de;
[2]Vetsuisse Faculty, University of Bern, Länggassstr. 122, CH-3001 Bern, francesco.origgi@vetsuisse.unibe.ch

First record of the *Bufonid herpesvirus* 1 (BfHV 1) in Thuringia (Germany)

The *Bufonid herpesvirus* 1 was detected on two dead common toads (*Bufo bufo*) from the city of Erfurt and Uder (administrative district Eichsfeld). Both specimens were found during the spring migration 2020. These are the first records of the pathogen in Thuringia (Germany). This observation was only possible because specimens were included into a museal collection and confirm the relevance of museum collections for the detection of pathogens.

Key words: *Bufonid herpesvirus* 1 (BfHV 1), first record Thuringia, *Bufo bufo*, museum collection material.

Zusammenfassung

Bei zwei toten Erdkröten (*Bufo bufo*) aus Erfurt und Uder (Landkreis Eichsfeld) mit deutlichen Hautläsionen wurde das *Bufonid herpesvirus* 1 nachgewiesen. Beide Individuen wurden während der Frühjahrswanderung 2020 gefunden. Es sind die ersten Nachweise des Pathogens in Thüringen (Deutschland). Die Untersuchung war nur durch die Aufnahme des Tiermaterials in eine museale Sammlung möglich und unterstreicht deren Relevanz für den Nachweis von Pathogenen.

Schlüsselbegriffe: *Bufonid herpesvirus* 1 (BfHV 1), Erstnachweis Thüringen, *Bufo bufo*, museales Sammlungsmaterial.

Einführung

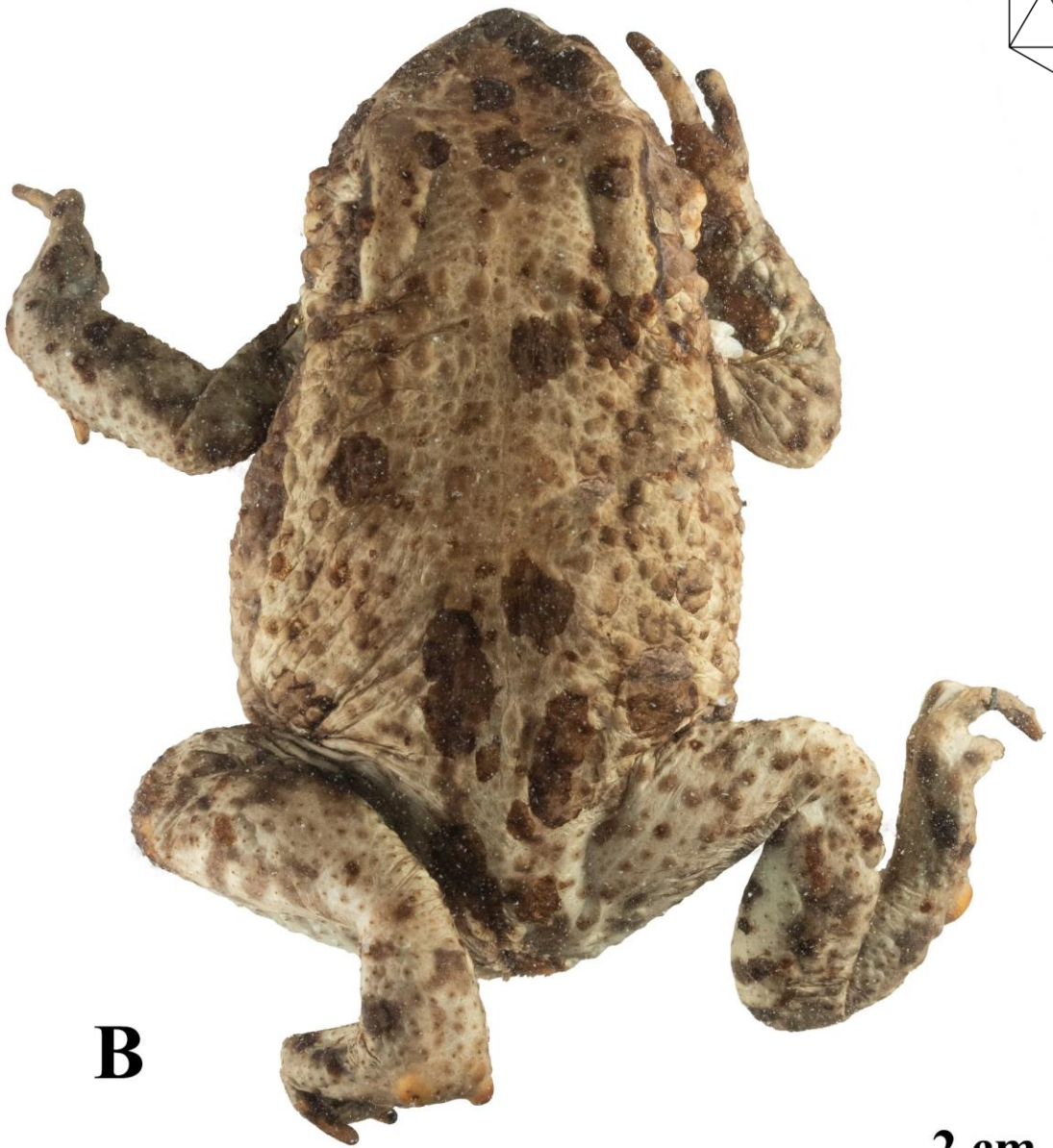
Während des Frühjahrs 2020 wurden zwei verendete Erdkröten (*Bufo bufo*) mit groß-

Natur
KUNDE
MUSEUM
ERFURT

Natur KUNDE MUSEUM ERFURT

Musealen Sammlungen kommt eine besondere Bedeutung zu!

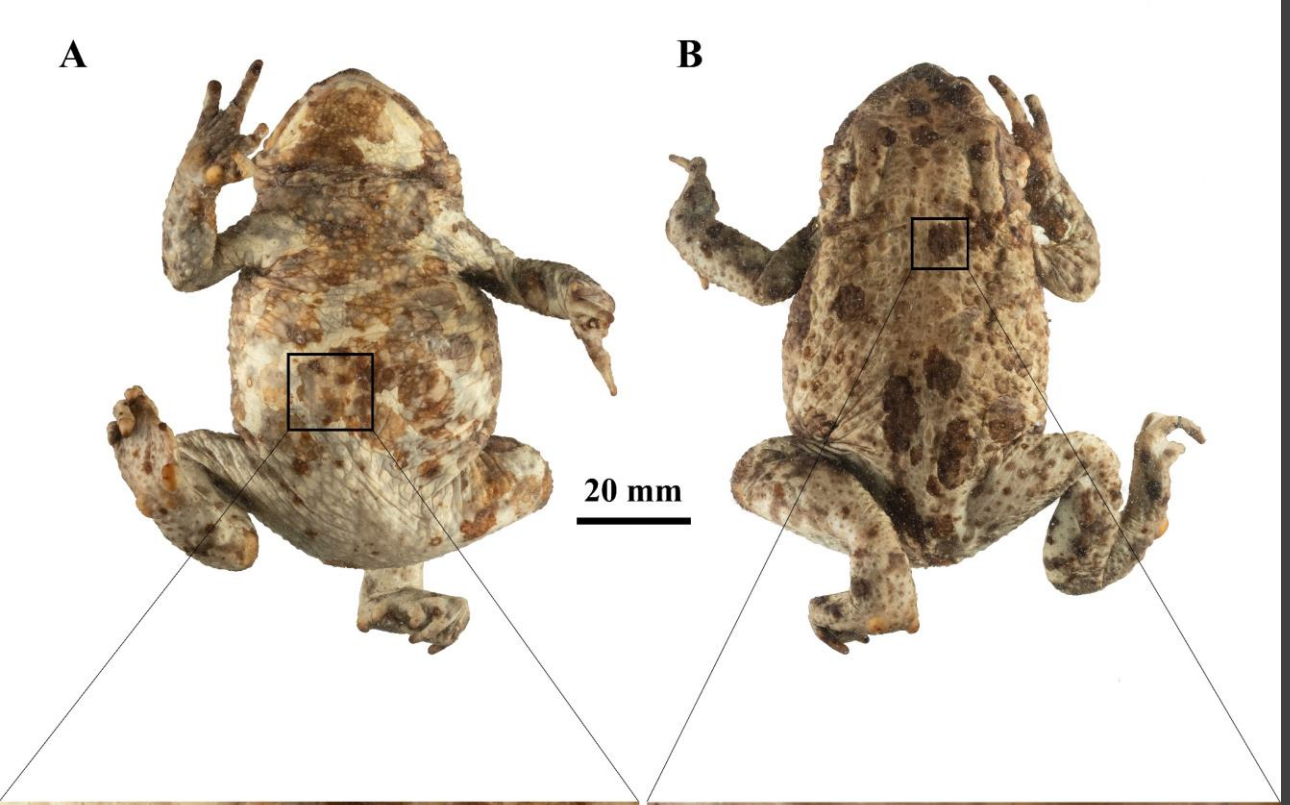
A

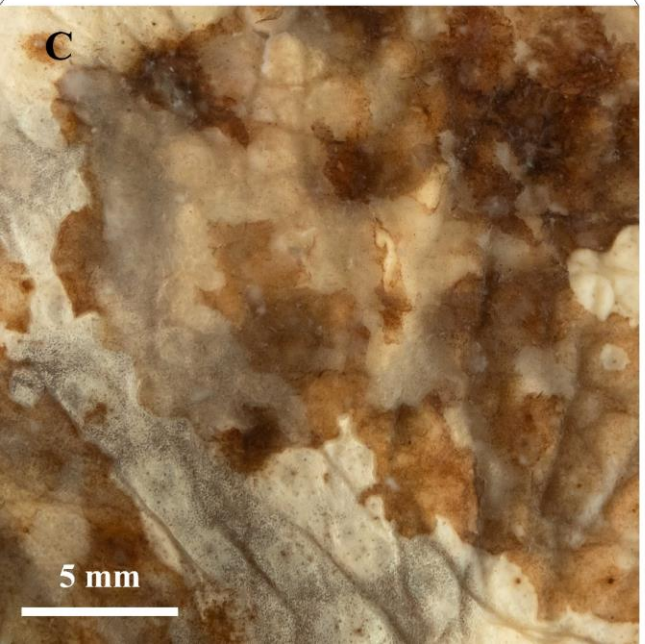


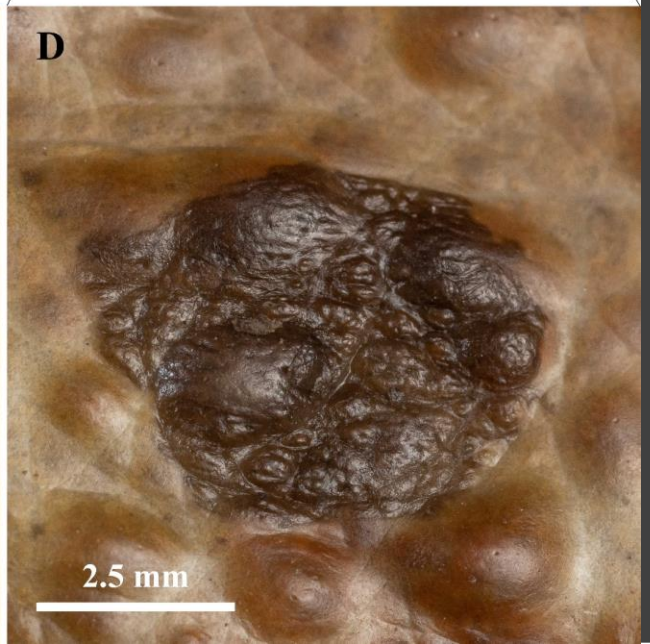
B

2 cm

Inventarnummer NME A 2377/20
Erfurt
19.03.2020







Pathologie

- Läsionen (Schädigungen) der Haut
- plaqueartige dunkelbraune abgegrenzte leicht prominente Areale
- abnormale Häutung
- zurückbleibende Häutungsreste
- autolytische Veränderungen der Epidermis

17,2 % mit Symptomatik

n_{gesamt} = 343 Individuen

$n_{positiv}$ = 59 Individuen

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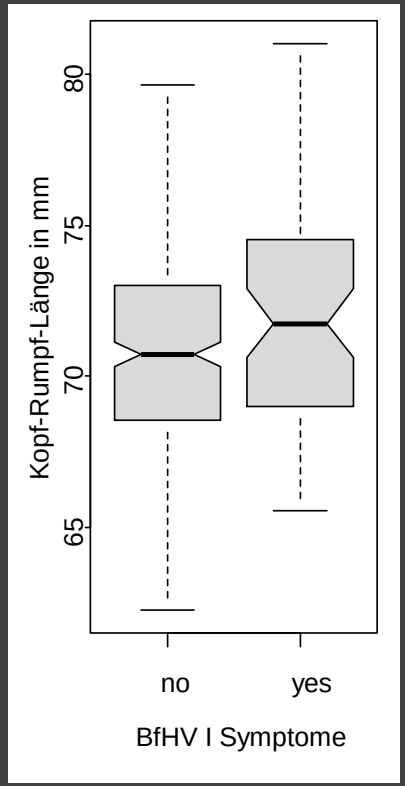

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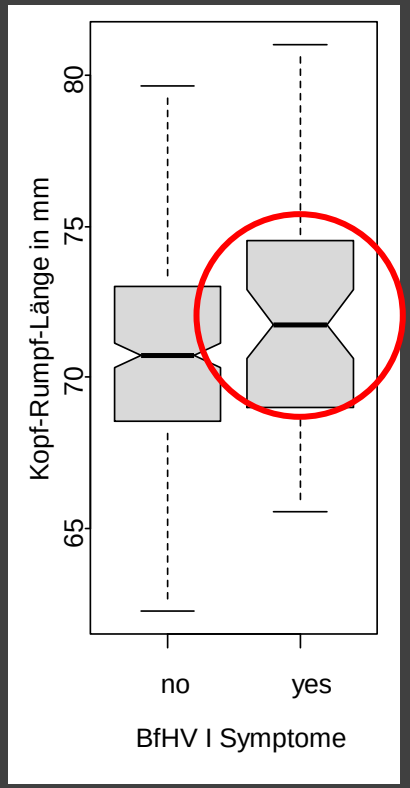

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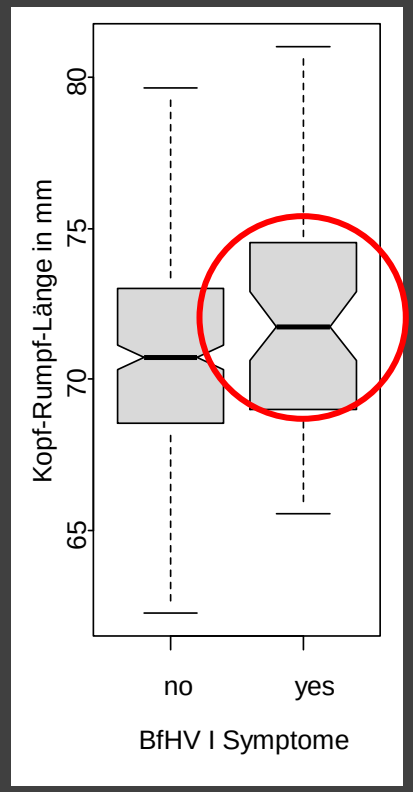

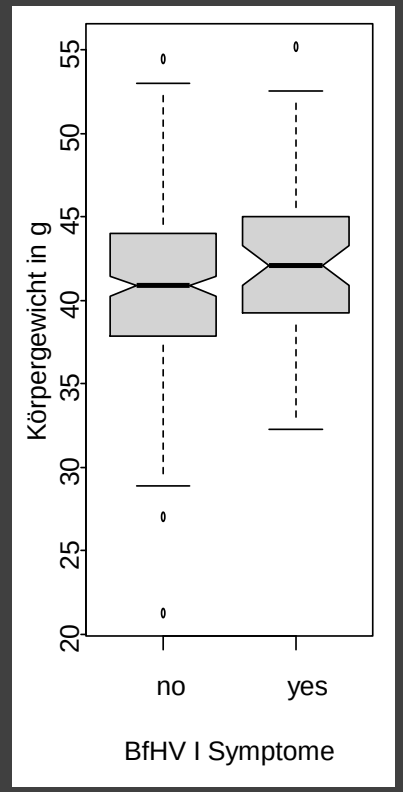

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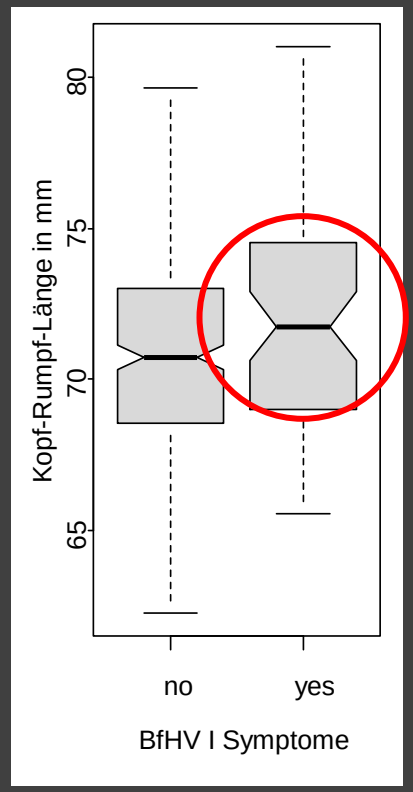

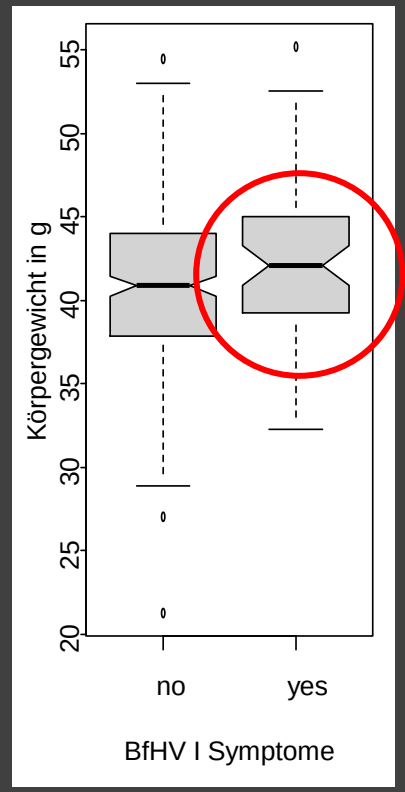

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Körperkondition

$$SMI = M_i \left[\frac{\overline{KRL}}{KRL_i} \right]^{b_{SMA}}$$

SM	Scaled Mass Index
M	Körpermasse
KRL	Kopf-Rumpf-Länge
b_{SMA}	individueller Exponent

DRAGULJIC et al. 2016, DODD 2010, PEIG & GREEN 2009, LABARBERA 1989

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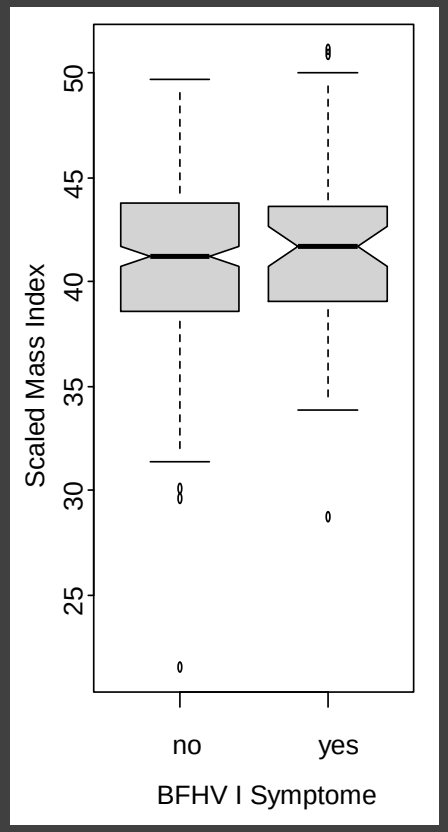

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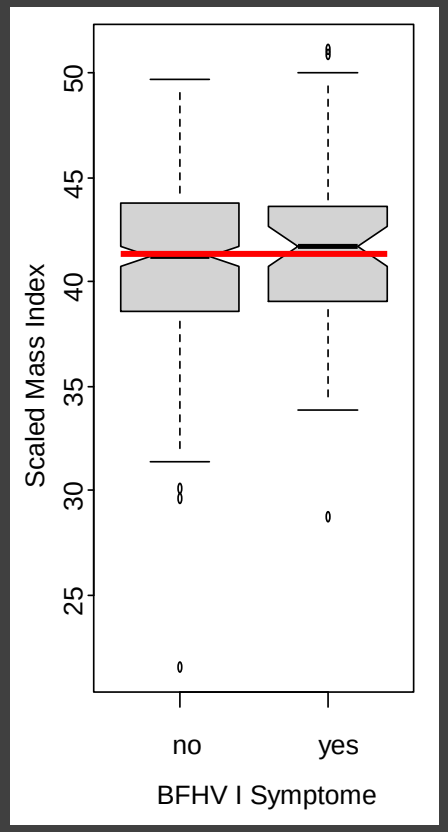

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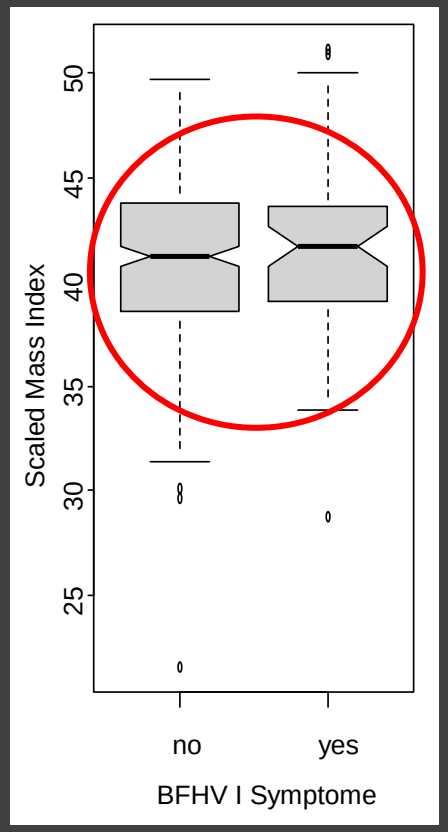

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Fazit

Morphometrische Daten sind wichtig!

Alte Datensätze müssen verfügbar gemacht werden!

Museealen Archiven/Sammlungen kommt eine besondere Bedeutung zu!

Fazit

Erdkröten sind heute kleiner.

Ursachen

?

Fazit

Erdkröten sind heute kleiner.

Ursachen
- Klima
- Nahrungsverfügbarkeit
- Demographie
- Krankheiten
- Pestizide

?

Fazit

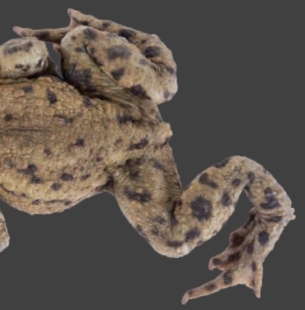
Individuen mit BfHVI – Symptomatik sind größer.

Fazit

Individuen mit BfHVI – Symptomatik sind größer.

Ursachen
- Alter
- Immunsystem
- Kontaktwahrscheinlichkeit
- ...

?




Danke für die
Aufmerksamkeit!
AMPHIBIEN
REPTILIEN SCHUTZ
THÜRINGEN
Natur
KUNDE
MUSEUM
ERFURT