Commission Reptiles et Amphibiens de Lorraine

Programme

6ème Rencontres herpétologiques du Grand Est

Nancy (54)

8 Novembre 2024

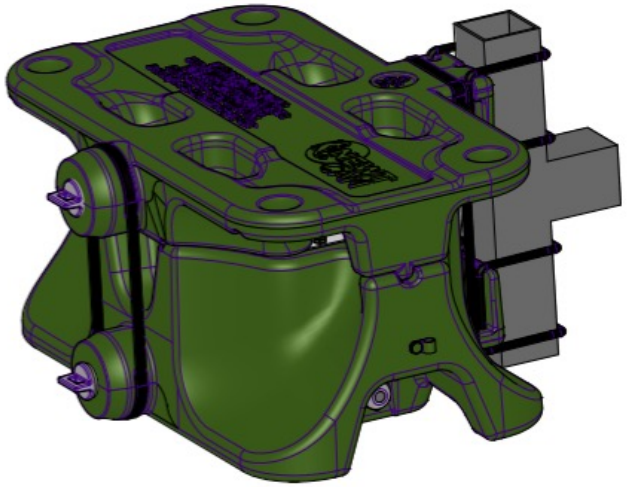
©VACHER Jean-Pierre

BUFO

Conservatoire d'espaces naturels Lorraine

Commission Reptiles et Amphibiens de Lorraine

SUD CHAMPAGNE



NEWTCAM

An underwater camera trap for freshwater wildlife monitoring

Xavier Mestdagh, **Lionel L'Hoste**, Thomas Degraeve, Mathieu Plateau, Adriano Gama, Daniel Waxweiler, Frank Minette, Martin Heyeres, Cyrille Charles, Mathilde Foucteau and Nicolas Titeux

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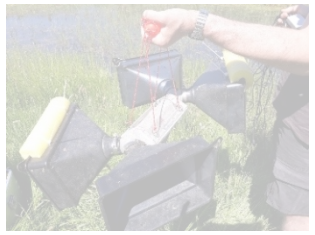
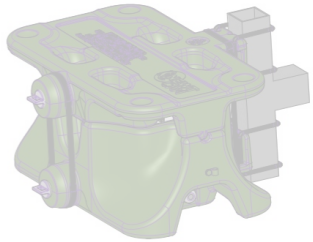
NEWTCAM: an underwater camera trap for freshwater wildlife monitoring

Timeline





2016
- 1st prototype (MSc student)
- Filled patent LU93388

2017
- FNR PoC application

2018
- NEWTRAP project
- 2nd prototype
- Field tests

2019
- 3rd prototype
- Field validation
- Web app (Newtrap manager)
- Design protection WIPO87166

2020

2021
- Bridges programme application
- Partnership with NHBS (public-private research collaboration)

2022
- Product development (hardware+ software)
- Filled patent LU504842
- Design protection WIPO136615
- Trademark application

2023
- Production line implementation
- Web portal development
- Research experiments
- Early users
- PhD (Liveable)

2024

2025
- Marketing on NHBS's Web shop

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2016 — 2017 — 2018 — 2019 — 2020 — 2025

FNR PoC

- FNR PoC application

Luxembourg National Research Fund

- Bridges programme application
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nhbs

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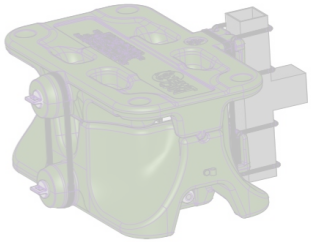

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NEWT CAM

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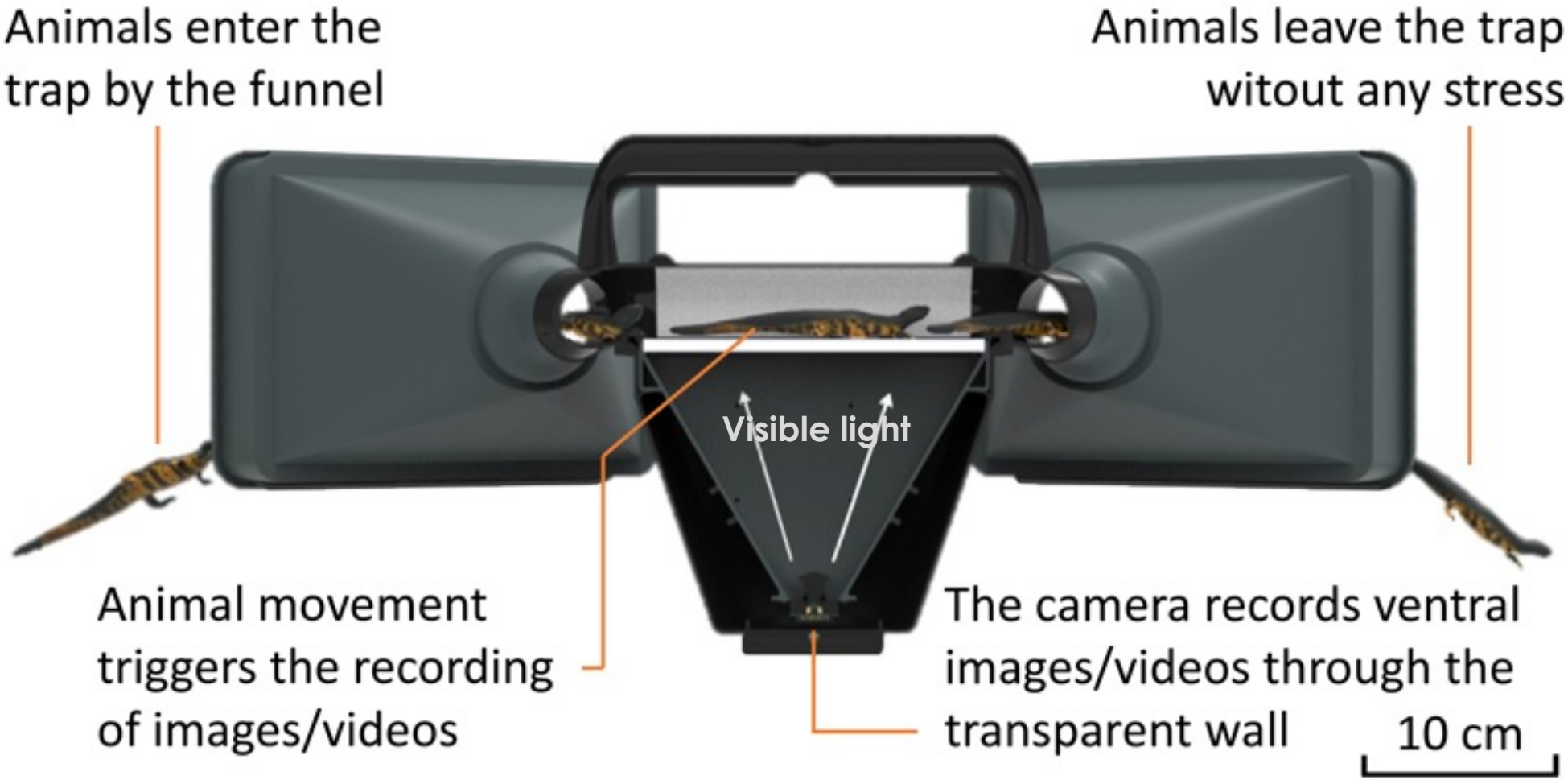
NEWTCAM: an underwater camera trap for freshwater wildlife monitoring

Description and operating principle



NEWTCAM: an underwater camera trap for freshwater wildlife monitoring

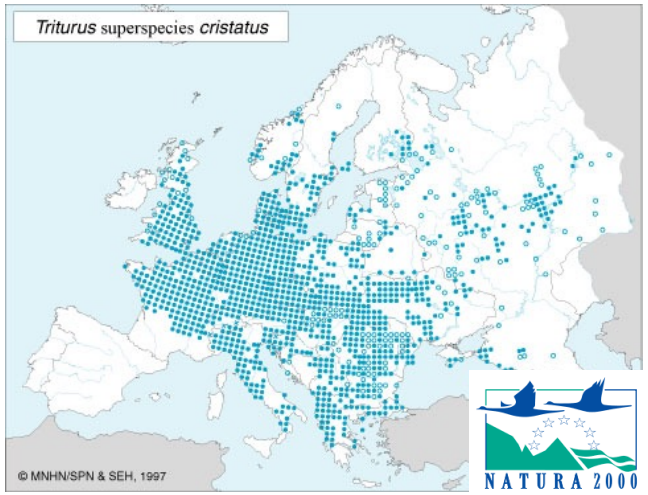
Field experimentation: Capture-recapture study

Comparison of 2 methods:

Funnel traps
X 12

VS

Camera traps
X 6

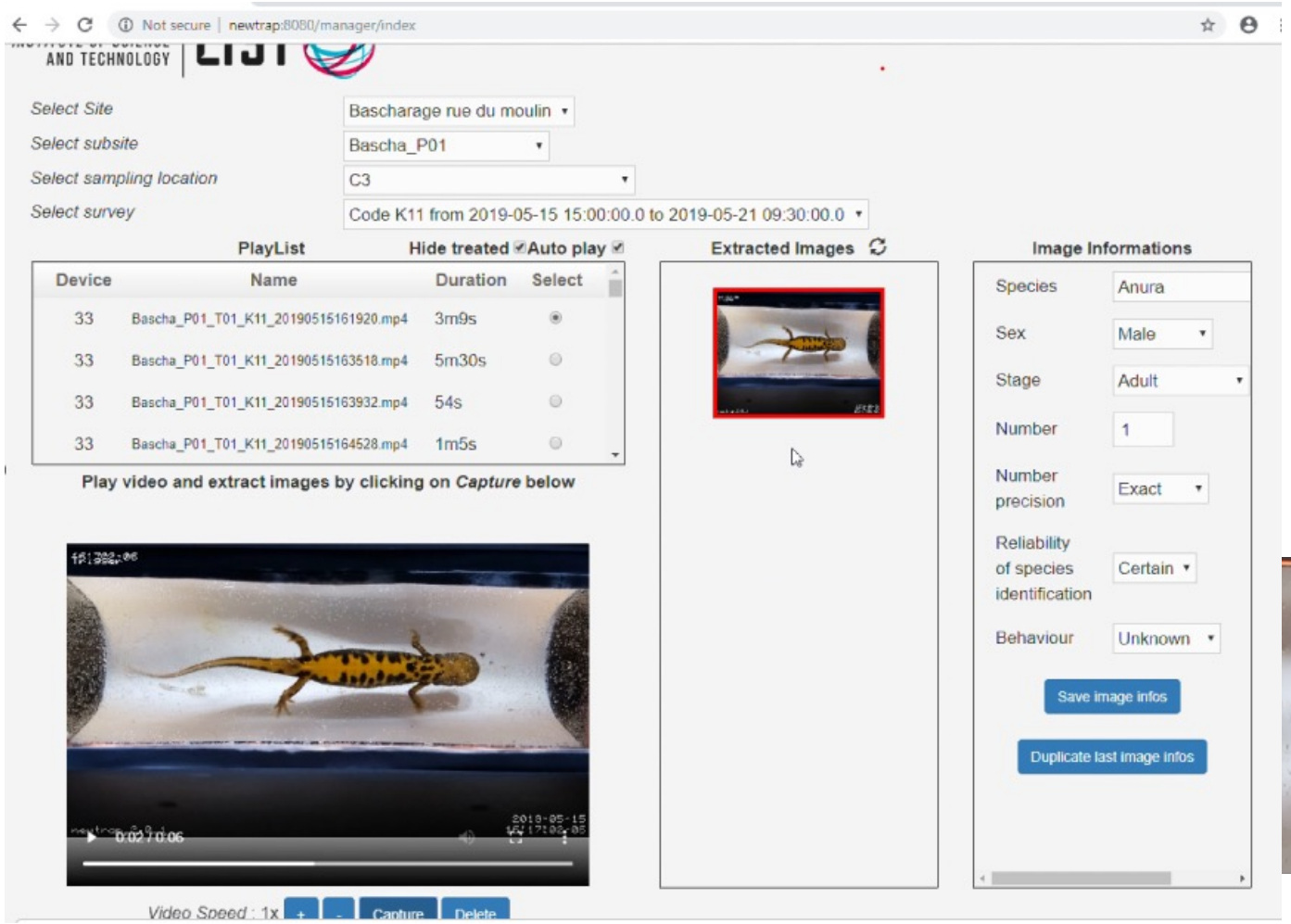


- Random sampling
- Up to 20 "capture" sessions, from March to July 2019

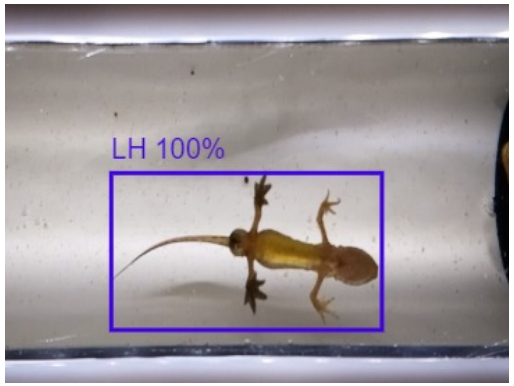
Device connected to a **battery** (60A.h) on the bank

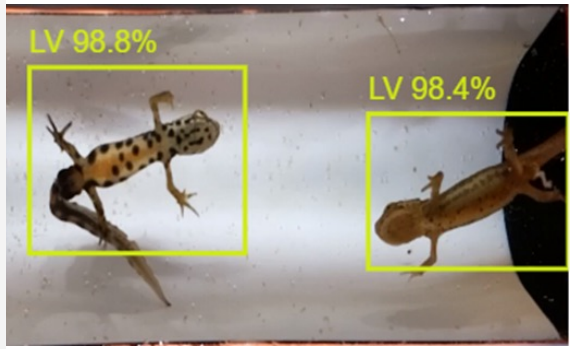
NEWTCAM: an underwater camera trap for freshwater wildlife monitoring

Data/media management: NEWTRAP manager



Automates species and sex (only for GCN) classification and cropping



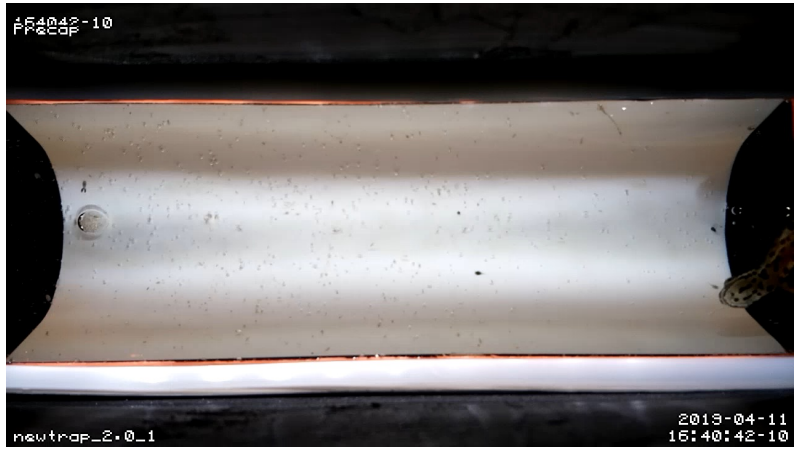


NEWTCAM: an underwater camera trap for freshwater wildlife monitoring

Field experimentation: observed species

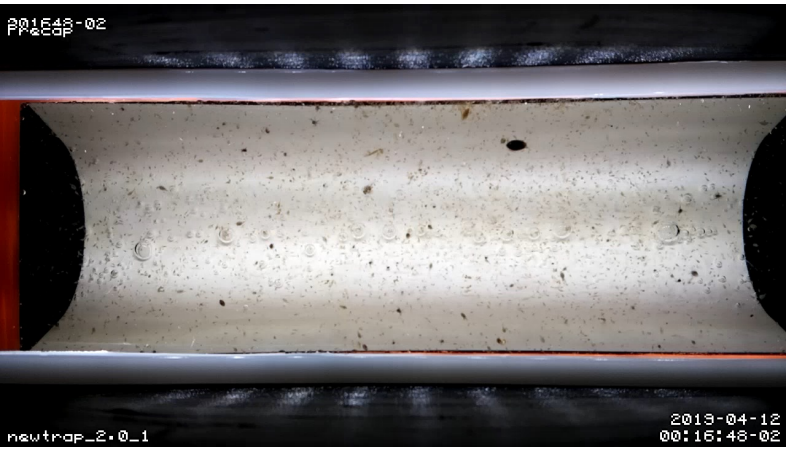
Palmate newt, male (*Lissotriton helveticus*)

Smooth newt, courtship (*Lissotriton vulgaris*)

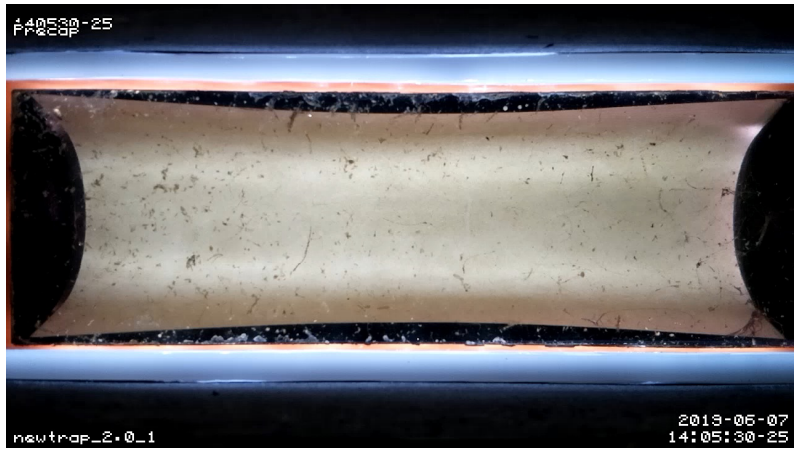


Great crested newt predating palmate newt

Alpine newt, female (*Ichthyosaura alpestris*)



Grass snake (*Natrix helvetica*)



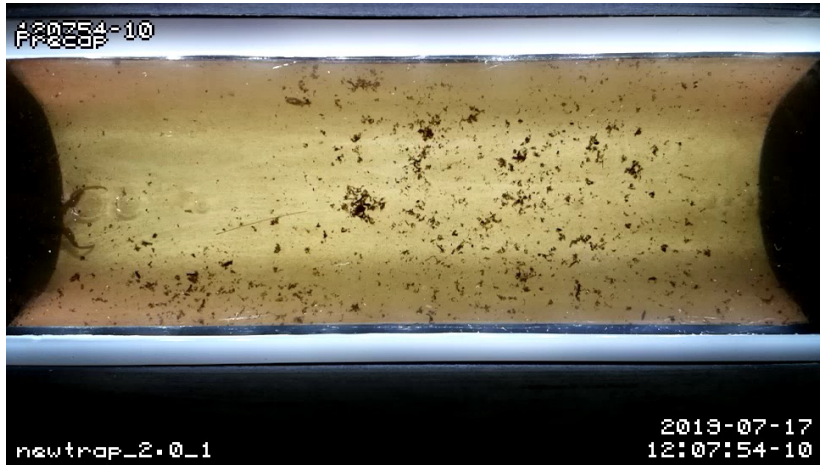
Great crested newt and leech

NEWTCAM: an underwater camera trap for freshwater wildlife monitoring

Field experimentation: observed species

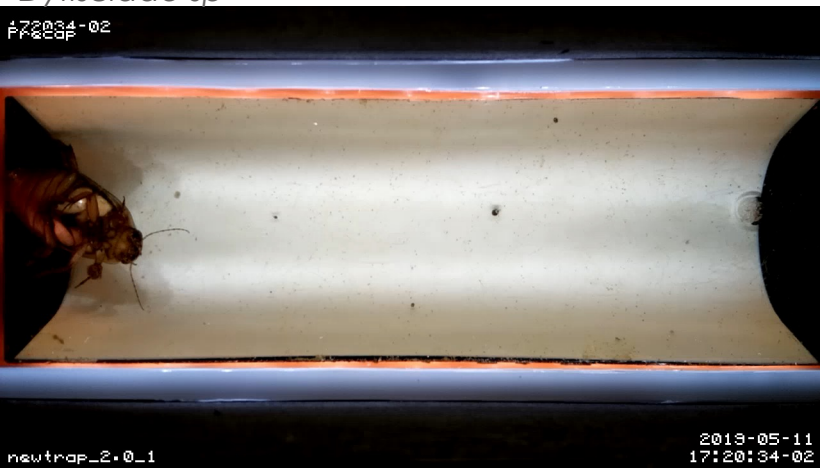
Ranatra linearis, Dytiscidae sp

Nepa cinerea



Pelophylax kl. esculentus

Dytiscidae sp



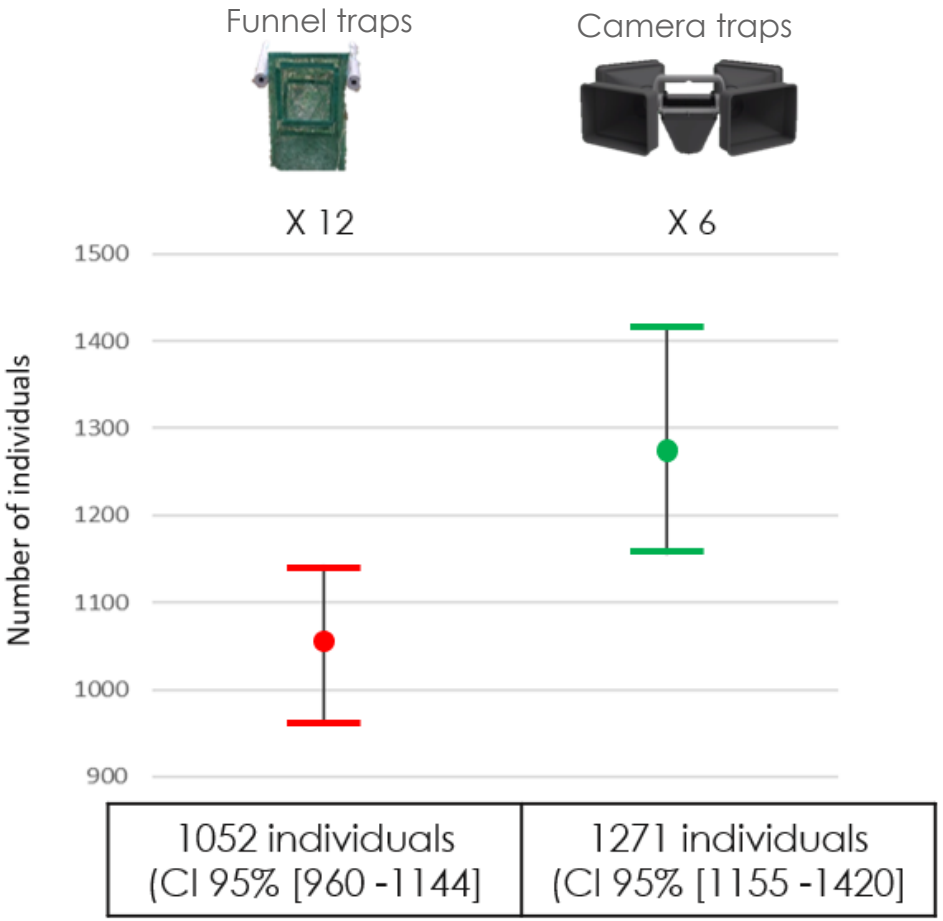
Great crested newt, larvae

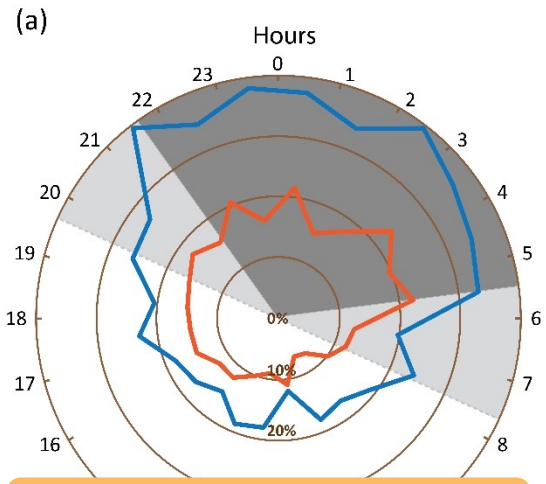
Great crested newt, battle

NEWTCAM: an underwater camera trap for freshwater wildlife monitoring

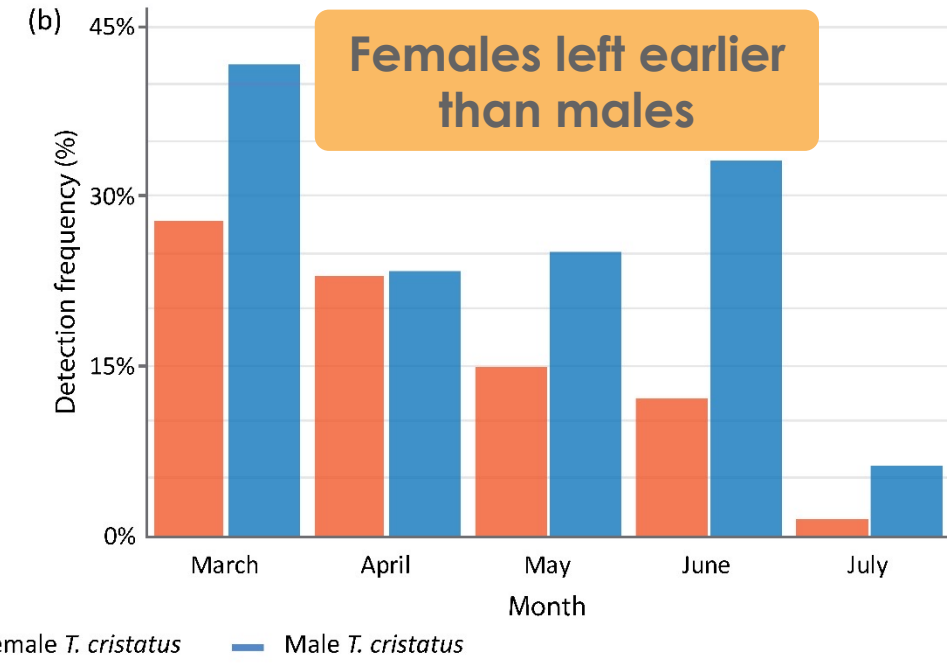
Results from field experimentation conducted in Bascharage (20[illegible])

~ Consistent population estimate





More detection during the night



Females left earlier than males

Interest of collecting data continuously

NEWTCAM: an underwater camera trap for freshwater wildlife monitoring

Field experimentation: conclusions

Depth

Time flexibility

No handling

Produces more data with less labour

Provides new possibilities for freshwater wildlife monitoring:

- Presence/absence survey
- Species assemblages
- Population estimates (body marks) / demographical studies (adult and larvae)
- Behavioural and mobility studies
- Phenological studies

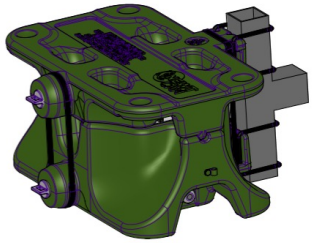
Additional studies required to understand species-camera trap interactions

Limitations:

- Shallow water: >20 cm
- Weekly cleaning
- Handle with care
- Sensitive to heat

NEWTCAM: an underwater camera trap for freshwater wildlife monitoring

Timeline



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NEWTCAM: an underwater camera trap for freshwater wildlife monitoring

Industrial partner: NHBS

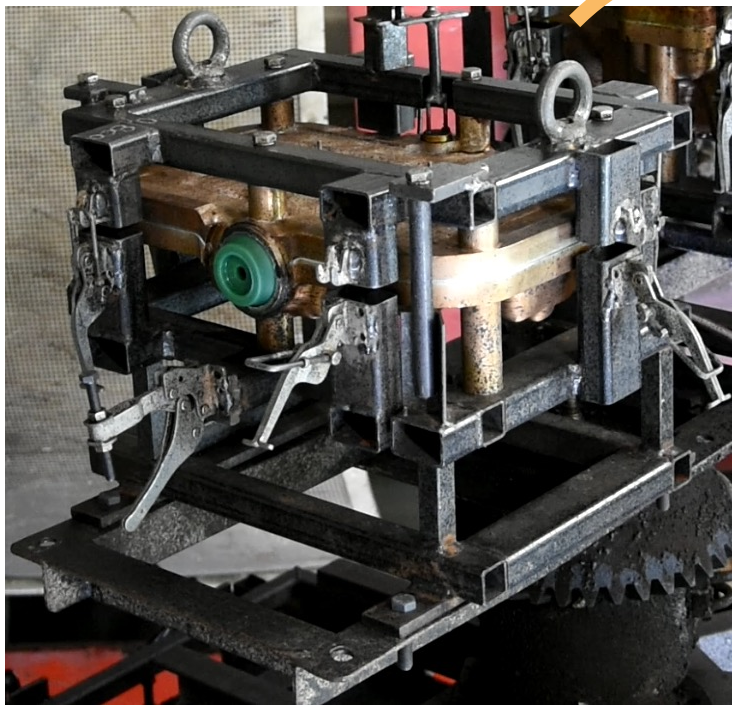
- Well-established marketing structure, international
- Workshop and warehouse space for storage components, manufacturing and testing devices
- Distribution centre and courrier network

NEWTCAM: an underwater camera trap for freshwater wildlife monitoring

Product development

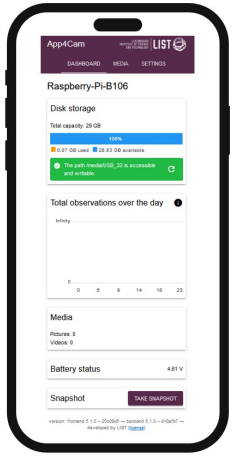
CAMPHIBIAN PROJECT

Rotomolding process



50 devices produced

NEWT CAM



App4Cam

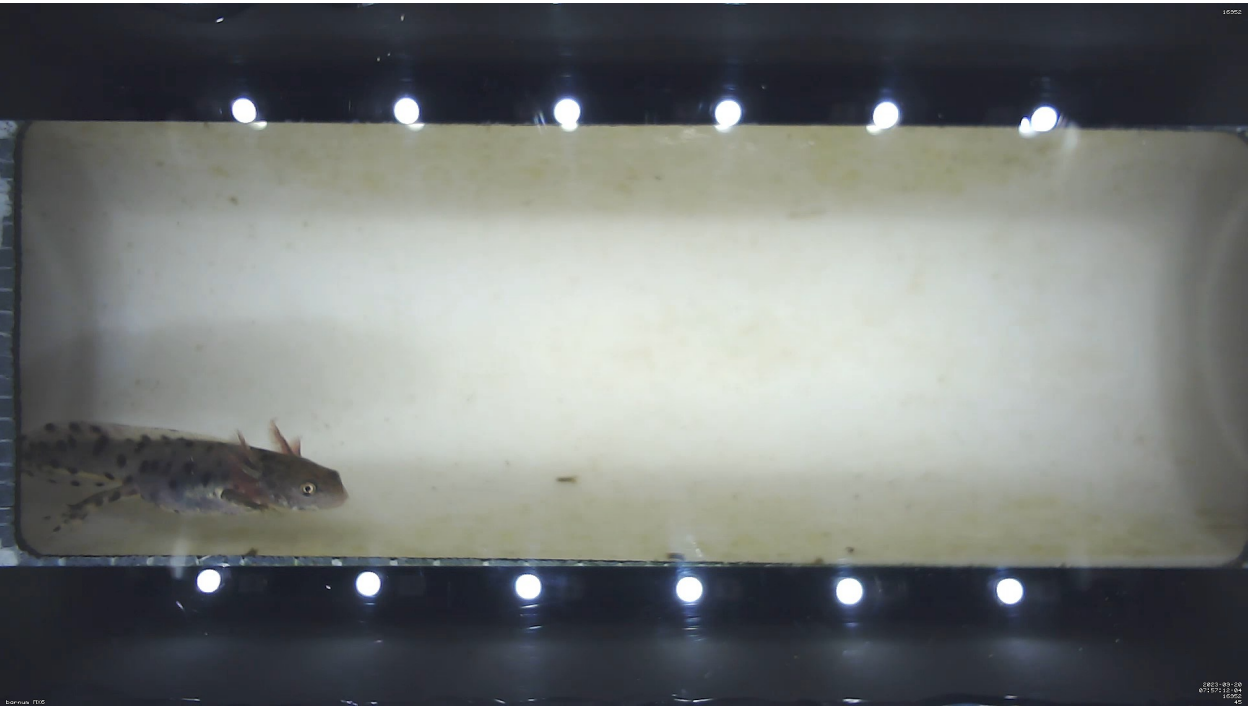
An application developed to configure the NewtCAM

NEWTCAM: an underwater camera trap for freshwater wildlife monitoring

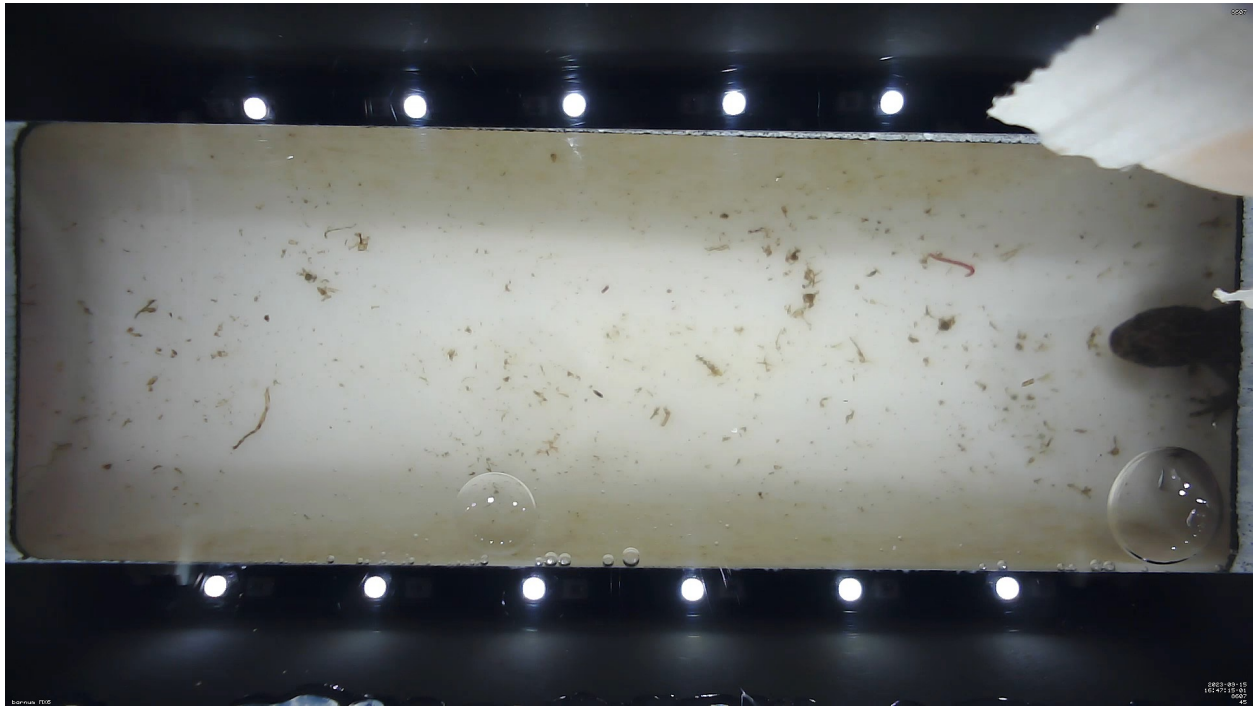
Product development

versatility and robustness

Lateral view



Dorsal view



NEWTCAM: an underwater camera trap for freshwater wildlife monitoring

Experiment on GCN larvae

CAMPHIBIAN PROJECT

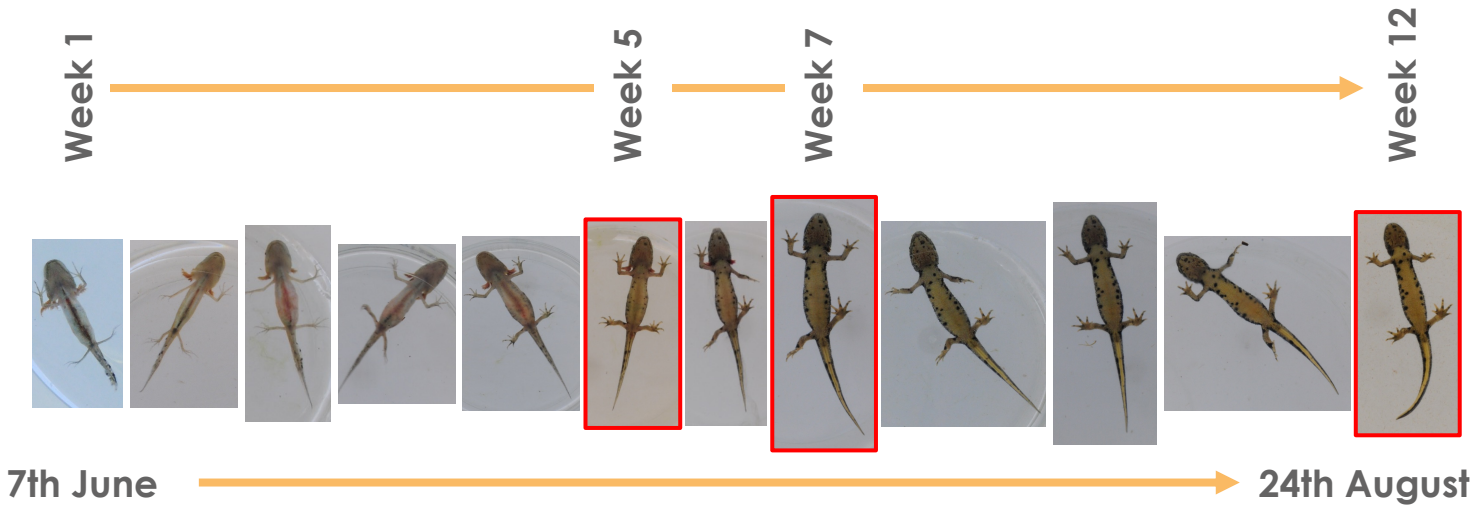
Lab experiment in controlled environment was carried out in summer 2023 :

- Collection of **47 GCN larvae** in a pond close to Bascharage - Luxembourg (WGS84 coordinates: 5.90640 E; 49.56013 N);
- **Larval rearing** in aquariums and **weekly belly shooting**.

NEWTCAM: an underwater camera trap for freshwater wildlife monitoring

Experiment on GCN larvae - 2023

Next step: field experiment to validate the **usefulness of the NewtCAMs to generate CR time-series** on GCN larvae



Week 5: belly pattern apparition

Week 7: Gills retractation

Week 12: Last belly shooting before release

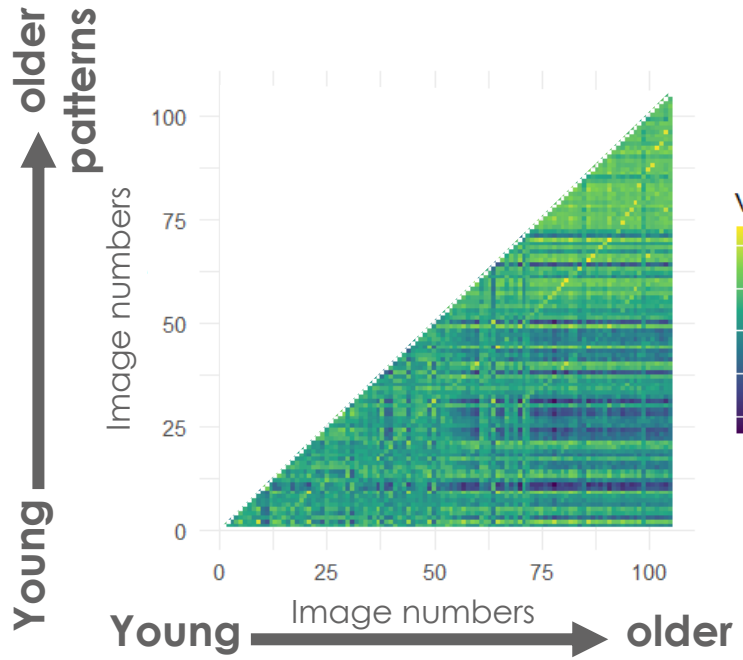
- **GCN larvae are individually identifiable during 3.82±0.66 weeks** before metamorphosis and potential emergence to terrestrial habitats.

NEWTCAM: an underwater camera trap for freshwater wildlife monitoring

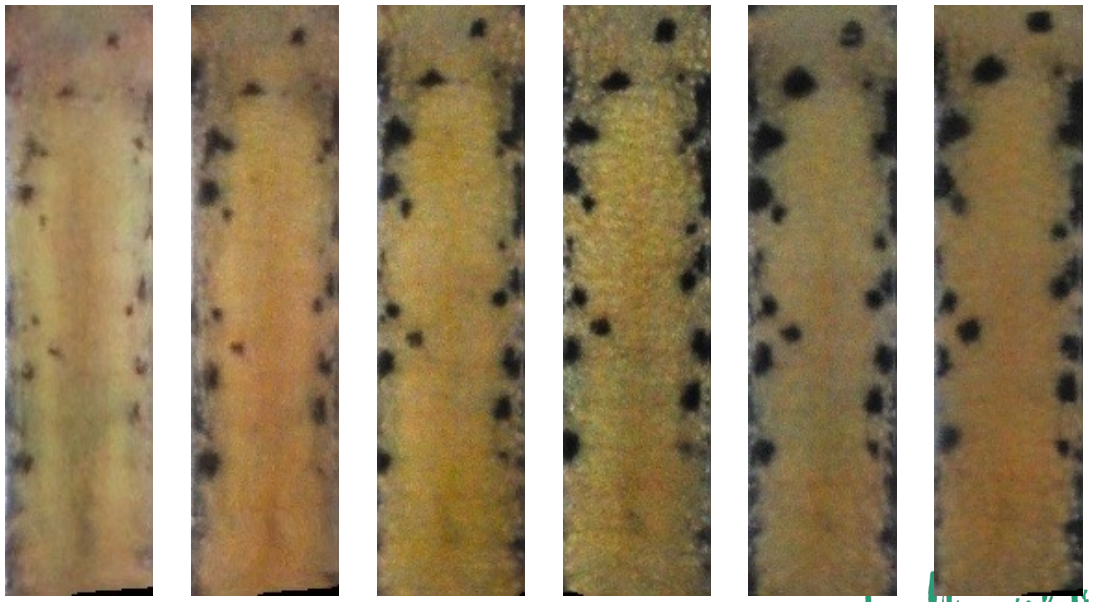
Experiment on GCN larvae - 2023

Evaluation of **AmphIdent software** to automate the photo-identification process

- Matrix plot of the equality scores (computed by Maximilian Matthé)
  - **Older patterns:** clear lines showing strong equalities
  - **Younger patterns:** no line but some bright spots, indicating matches

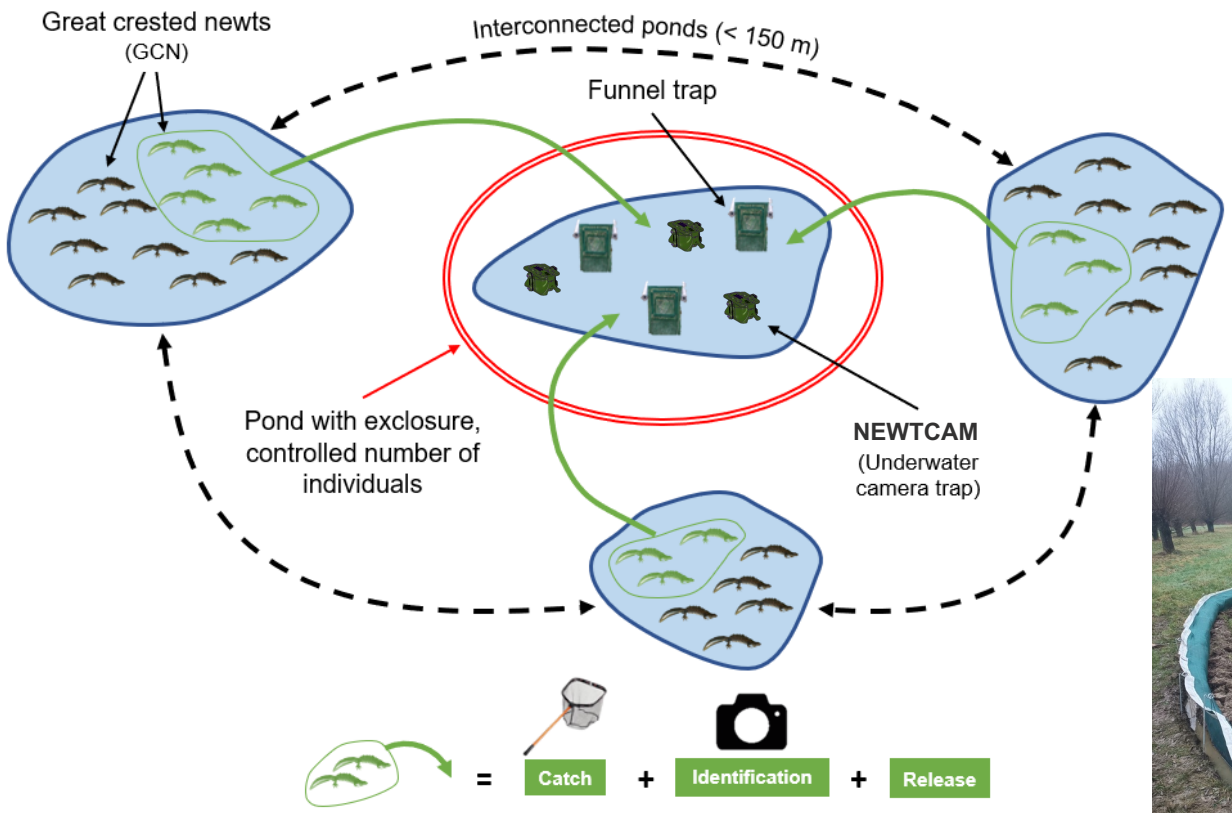


1 means perfect match, 0 means no matching pixels at all



NEWTCAM: an underwater camera trap for freshwater wildlife monitoring

Experiment on GCN adults - 2024



- Use of two methods to generate **capture recapture** (CR) **time-series**: NewtCAM and funnel trap
- CR on a closed population
- **130** (42 ♀ / 88 ♂) **GCN captured** in the surrounding ponds and released in the fenced pond

Both methods estimated consistently the known population size (NewtCAMs: 105.9±11.4 individuals; funnel traps: 118.1±9.9 individuals)

NEWTCAM: an underwater camera trap for freshwater wildlife monitoring

LIVEABLE : Living on the edge

- AFR PhD in Luxembourg : Mathilde FOUCTEAU

Research goal:

Understand ecological requirements and **environmental constraints** for the **conservation** of the **Great Crested Newt** at the southern limit of its range and in the contact zone with the **Marbled Newt**

Funded by:

Partners:

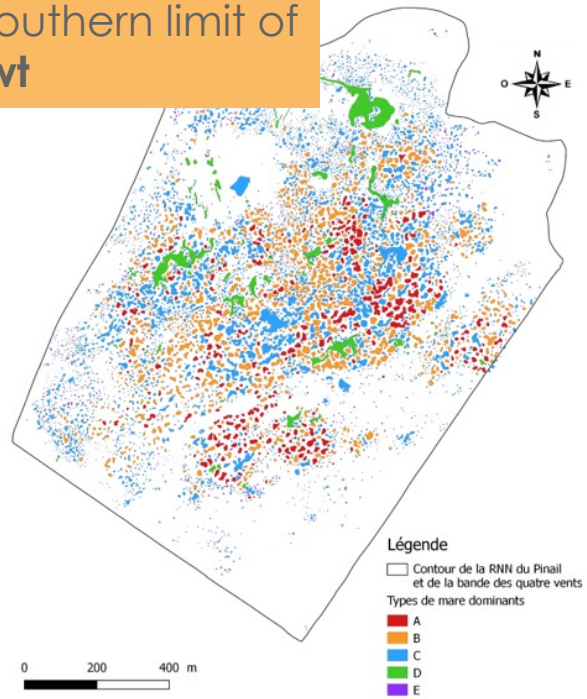


Figure 242 : Répartition des types de mares sur la Réserve naturelle du Pinail et la bande des quatre vents

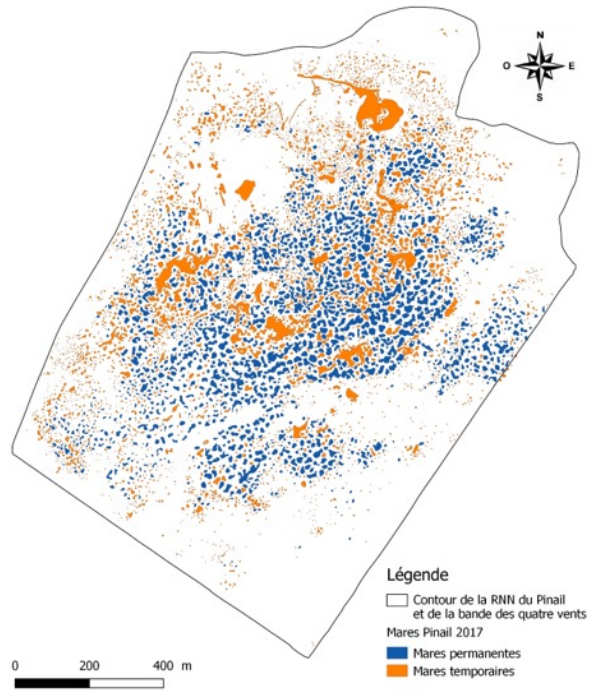


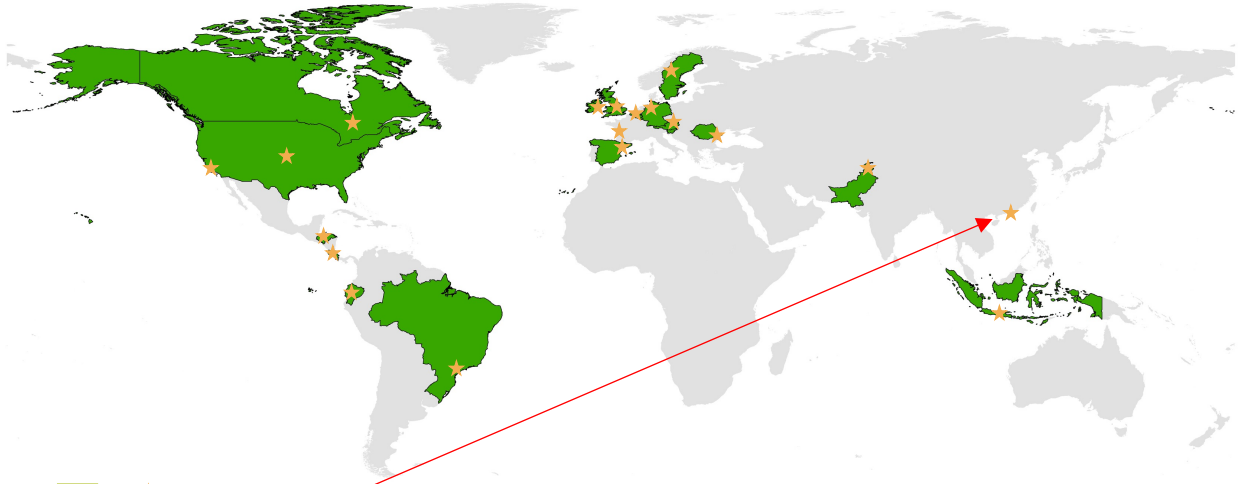
Figure 241 : Répartition des mares temporaires et permanent de la Réserve naturelle du Pinail et bande des quatre vents

NEWTCAM: an underwater camera trap for freshwater wildlife monitoring

50 units produced, made available for early users

Targets:

- Amphibians (newts, frogs and toads)
- Reptiles (water snakes, turtles)
- Fish
- Macroinvertabrates



■ / ★ Country / localisation where at least one NewtCAM will be deployed

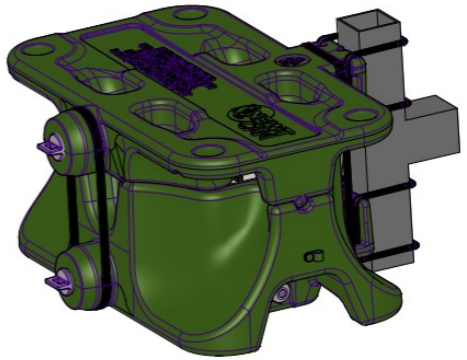
Interested in **comparing our device** with your **standard approach**?

Please contact us!!

xavier.mestdagh@list.lu

lionel.lhoste@list.lu

Paramesotriton hongkongensis



NEWT CAM

Xavier Mestdagh xavier.mestdagh@list.lu

Lionel L'Hoste lionel.lhoste@list.lu

Merci

En partenariat et avec le soutien de

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