

Schistosomiasis





A young boy stands in a muddy stream, holding a piece of white cloth. A man is bent over, washing a bicycle in the same stream. The water is brown and murky. The background shows a grassy bank with some litter.

+400 million
Lack safe water



+250 million

People infected with schistosomiasis





22 x

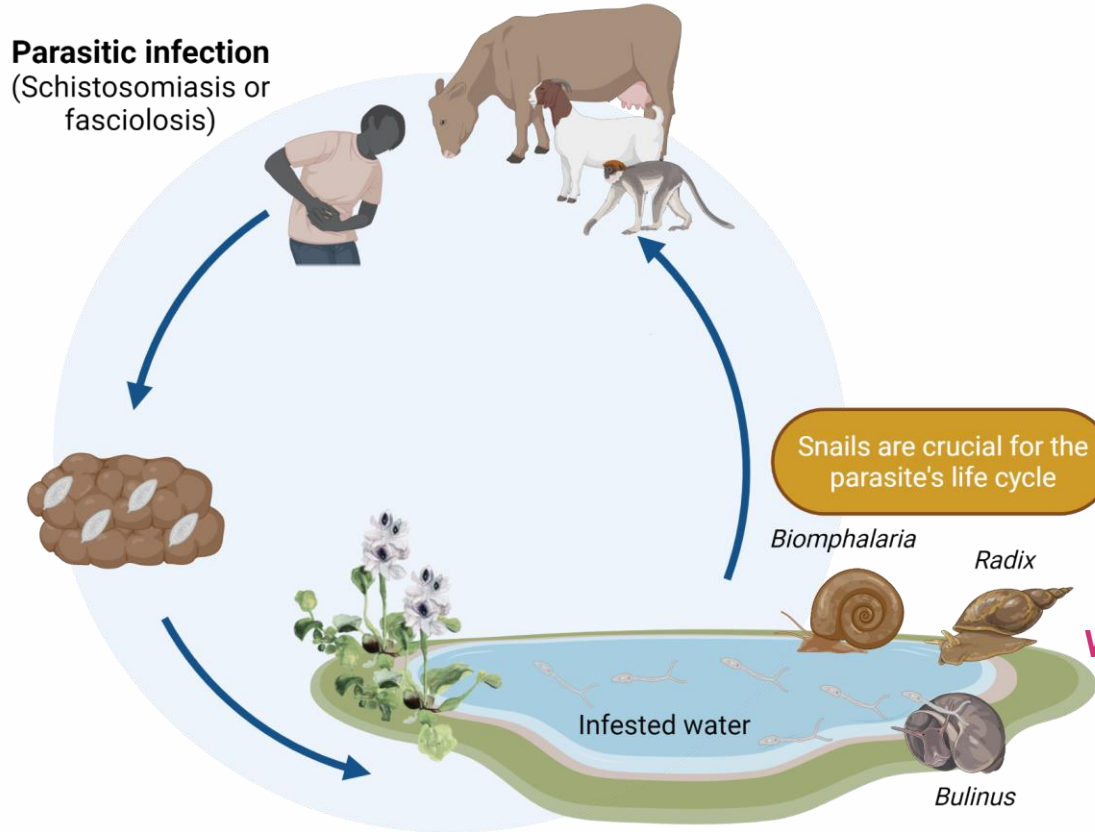
Belgian population

Data collection and validation in the ATRAP project

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Infection cycle: snail-borne diseases



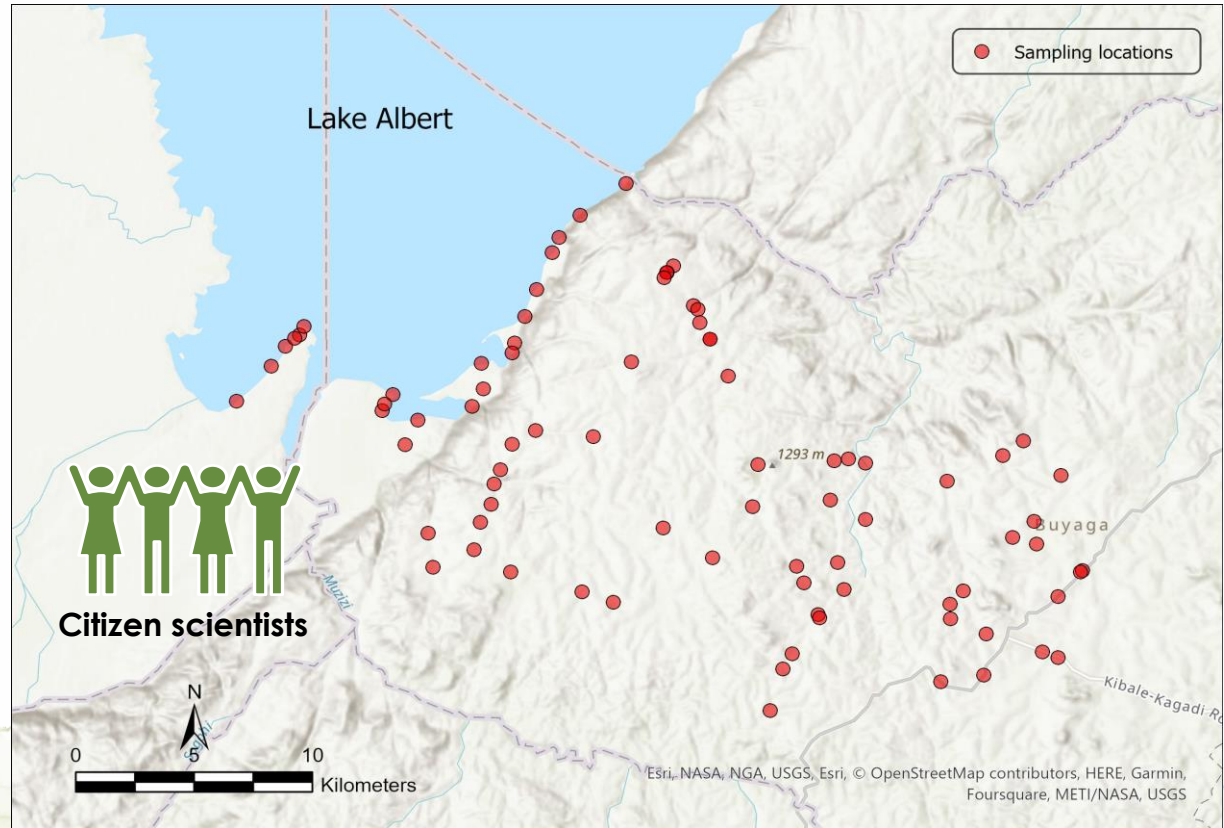
Without snails there is NO DISEASE

The solution: Citizen Science



Citizen science to monitor schistosomiasis

Action Towards
Reducing Aquatic snail-
borne Parasitic
diseases



Citizen science to monitor schistosomiasis



Citizen scientists

Protective gear + snail scoop



Smartphone



Snail ID key



KoBoToolbox to send snail data to the cloud



Can we trust
citizens?

Unlocking the potential of Citizen Science



Automatic validation



Visual Validation



Observation bias



Plus: Artificial Intelligence



Protective gear + snail scoop



Smartphone



Snail ID key



KoBoToolbox to send snail data to the cloud

Flag evident mistakes

1. ID checking
2. GPS not locating real position
3. 20 > Scooping time > 40 minutes



Unlocking the potential of Citizen Science



Automatic validation



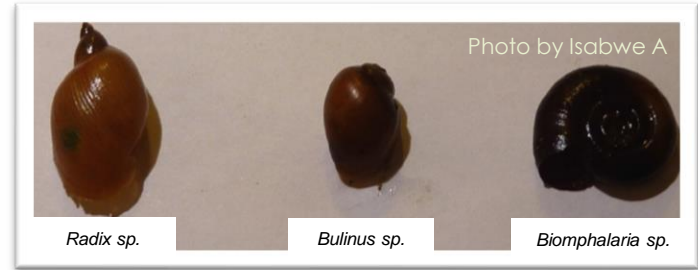
Visual Validation



Observation bias



Plus: Artificial Intelligence



- Species ID
- Count of individuals

71594 snails

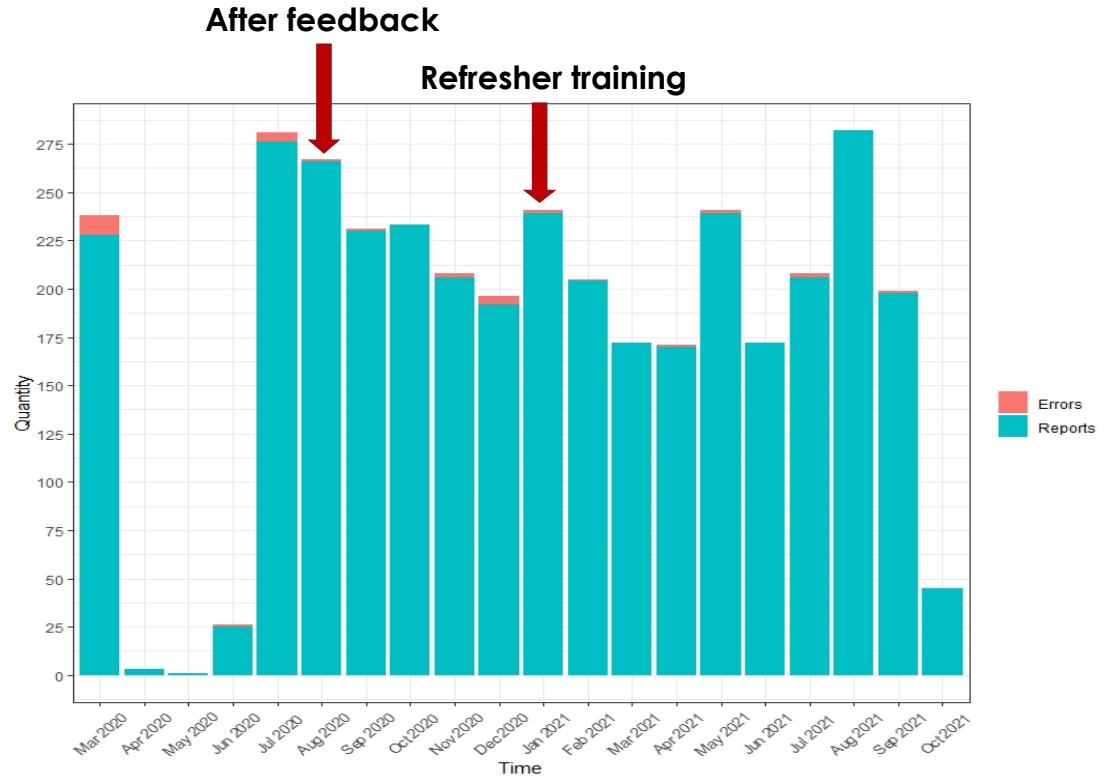
Unlocking the potential of Citizen Science

5172 reports
in 20 months

- *Biomphalaria*: 39 – 0.75 %
- *Bulinus*: 110 – 2.13 %
- *Radix*: 78 – 1.51 %



Constant feedback



Brees et al. 2021

Unlocking the potential of Citizen Science



Automatic
validation



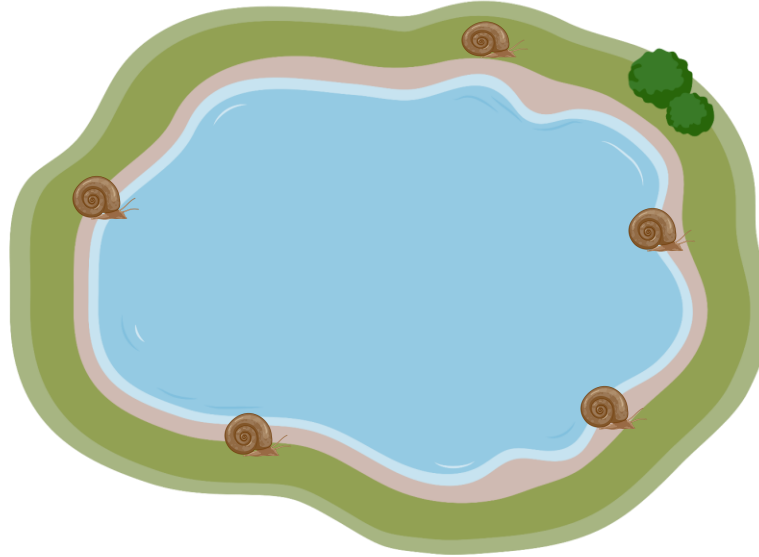
Visual
Validation



Observation
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Plus: Artificial
Intelligence



Unlocking the potential of Citizen Science



Automatic validation



Visual Validation



Observation bias



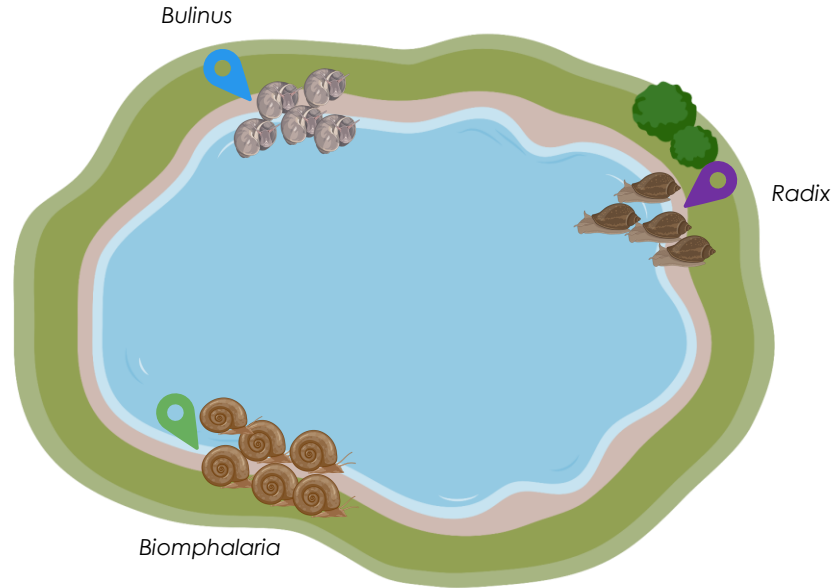
Plus: Artificial Intelligence



Expert



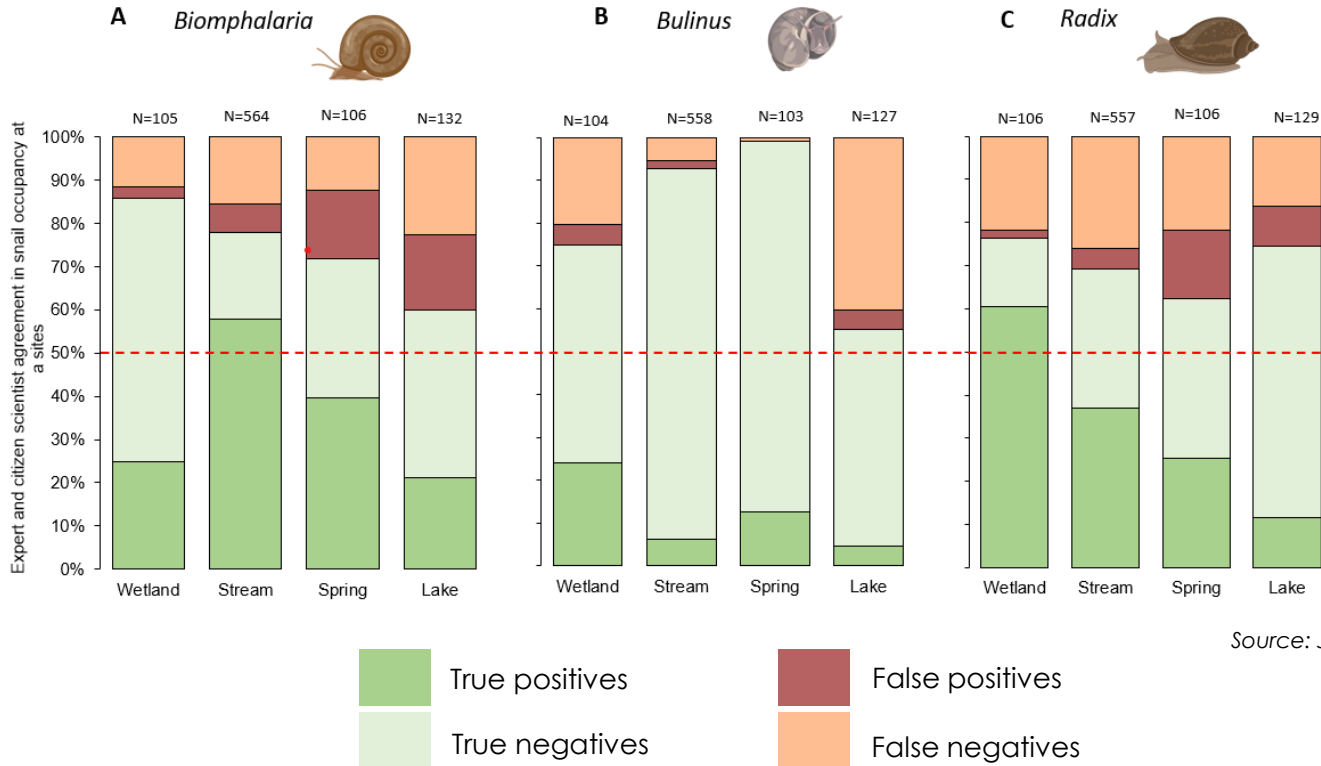
Citizen scientists



Presence and absence

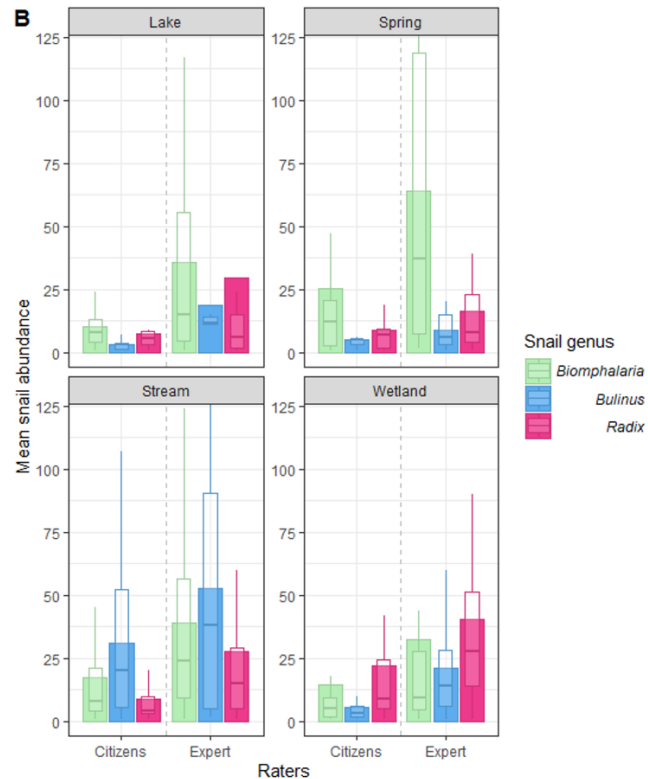
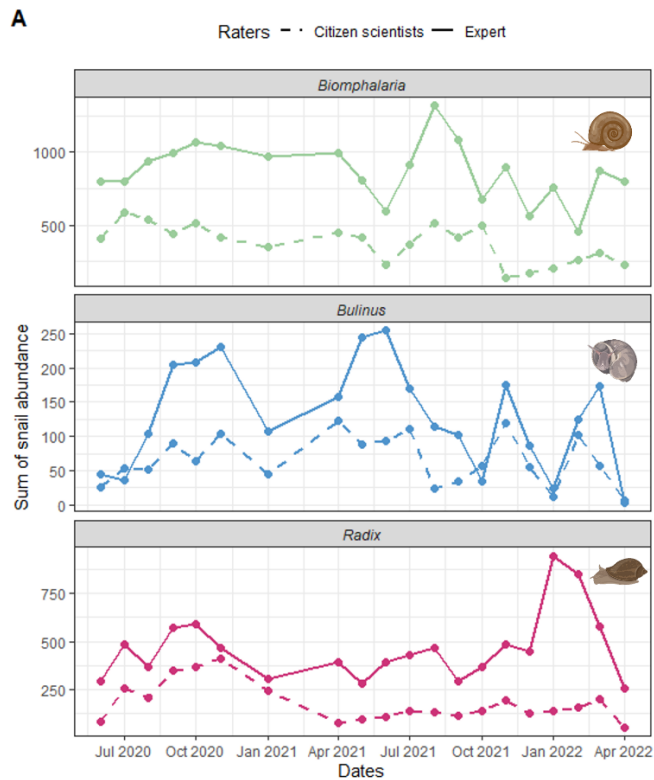
Abundance

Presence and absence : agreement



Source: J. Tumusiime

Abundance: agreement



Unlocking the potential of Citizen Science



Automatic
validation



Visual
Validation



Observation
bias



Plus: Artificial
Intelligence

Welcome to the snail host detector!

This is an API to be used by the public to detect snail species that act as an intermediate host for two common neglected tropical diseases of great public and veterinary health importance: schistosomiasis and liver fluke disease.

Introduction

This web-API is a deep learning object detector that is designed for the public to upload snail images and detect if the images contain one of the intermediate host (IH) snails of the neglected tropical disease (NTD), [schistosomiasis](#) or [fasciolosis](#). These diseases are spread by snail species that belong to the genus *Biomphalaria* or *Bulinus*, and *Lymnaea* respectively. This makes the detection of IH snails automatic and more efficient than manual identification and, ultimately, may help in faster detection of disease hotspots.



Biomphalaria spp.



Lymnaea spp.

<https://snaildetector.africamuseum.be/>

Conclusions

- Presence and absence
- Abundance: quantitative
- Abundance: qualitative
- Citizen science – snail control





TRA A BILHARZIA
FREE COMMUNITY

Bilharzioa (erruska) kaltetu

- Bilharzioa ez da jarduera arrunt bat.
- Bilharzioa ez da jarduera arrunt bat.
- Bilharzioa ez da jarduera arrunt bat.
- Bilharzioa ez da jarduera arrunt bat.
- Bilharzioa ez da jarduera arrunt bat.
- Bilharzioa ez da jarduera arrunt bat.

Erriango jokatu behar du bilharzioa

The type of water you drink

Citizen scientists!
motivation!





Thank you for your attention!

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Scivil Networking Day 2022