

Case study

Sweden

Safeguarding Sweden's population against ticks

The first records of adult *Hyalomma marginatum* and *H. rufipes* ticks in Sweden were reported in 2018 (Grandi et al., 2019). These findings were the starting point of a new surveillance report system at the National Veterinary Institute (SVA) where the general public was encouraged to send photos of uncommon/exotic ticks.

Since 2018, repeated findings of adults of alien tick species (e.g., *H. marginatum*, *H. rufipes* and *Dermacentor reticulatus*) have been reported in Sweden. Climate change is probably one explanation for this trend. Monitoring alien ticks is highly relevant since they could introduce new zoonotic tick-borne pathogens.

Case Study Objective

Involve the general public in reporting the occurrence of ticks in Sweden by:

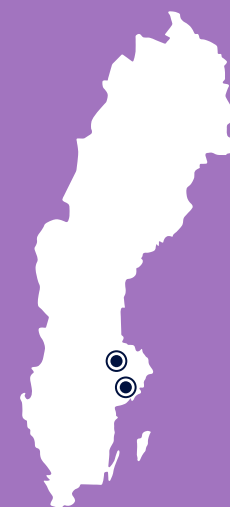
1

Registering tick findings in Sweden with the help of the web-based tool Rapportera Fästing and sending the specimens to SVA when available

2

Increasing preparedness against tick-borne pathogens in Sweden

Stockholm and Uppsala (the fourth largest urban area in Sweden) have been selected as case study locations as both cities are connected to various parks, forest areas, and nature reserves frequently used by the urban population and visitors. The region has endemic Lyme disease and tick-borne encephalitis (TBE). Several hot spot areas for TBE are located in the archipelagos of Stockholm and Uppsala and climate impacts on tick-borne diseases are expected here.



Stockholm is the most populous urban area in Sweden. Winters are -3 to -1 °C, and occasionally drop below -20 °C, but the average temperatures generally remain above 0 °C most of the year. Summer temperature is 20 – 25 °C. Precipitation occurs throughout the year (average 546 mm).

Uppsala is 71 km north of Stockholm). Summer and winter temperatures follow the mean values for Stockholm, but with an average yearly rainfall of 565 mm.

Contact

Dr. Anna Omazic
National Veterinary Institute (SVA)
Sweden

anna.omazic@sva.se





Current Measures & Case Study Focus

Since the first reports in 2018, the Swedish public has been encouraged to send photos and samples of uncommon/exotic ticks. Ticks received were identified to the species level by morphological keys and stored at -80°C waiting for molecular and microbiological analysis.

To streamline this process, SVA has developed the web-based tool *Rapportera Fästing*. It includes an image classifier based on existing citizen science reporting of tick observations, allowing automated monitoring and trend analyses of geospatial tick species patterns.

The tool allows the user to choose the tick they are reporting from a display of tick images, listed from the most to the least common species. The user can also upload a photo, and provide information on:

- ✓ Host species (scroll list: e.g., human, dog, cat, horse, cattle, wild animal, environment, other)
- ✓ Number of ticks found
- ✓ Geographical position of the finding

Activities

The project team will continue involving the general public in reporting tick occurrences in Sweden.

The web-based tool, *Rapportera Fästing*, has streamlined the reporting process. Over 13,000 reports have been submitted via this tool as of June 2023.

This first version of the tool has been tested during the May to October 2023 tick season. It is now being evaluated and revised based on feedback from citizens and researchers.

“ This report tool is of high importance since new species of ticks, e.g., alien/exotic ticks, could introduce new zoonotic tick-borne pathogens in the northern atmosphere.

If we can further, educate and communicate results from the work with the report tool, I strongly believe it is an activity that can increase preparedness against tick-borne pathogens in Sweden.

”

Research Aims & Outputs

The report tool developed in this project helps monitor alien ticks, which is important since these ticks could introduce new zoonotic tick-borne pathogens, increasing preparedness in Sweden.

The next step is adding image analysis by artificial intelligence into the tool. All photos submitted in the first year will train the AI to correctly identify tick species.

The tool will be further evaluated in January 2024, with an updated version planned for May 2024. A third version is planned for January to April 2026. At each iteration, feedback will go to citizens and researchers. By the project's end, this tool may also be used in other Scandinavian and European countries. For example, if set up in Spain, the image panels could change to relevant local tick species.

Data will be regularly reviewed and the tool evaluated. Researchers will access data submitted from 2023-2026.