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Surveys and contingency preparedness in Sweden for bronze birch and emerald ash borers

Outline

- Surveys for bronze birch borer (BBB, *Agrilus anxius*) and emerald ash borer (EAB, *Agrilus planipennis*)
  - Past
  - Present
  - Future?
- Contingency work for BBB and EAB
  - Key elements of Swedish contingency plans
  - Simulation exercises
- Interplay between survey and contingency work

Surveys for BBB and EAB - past

- Surveyed since 2015

- Two-component survey at the onset:
  - Visual inspections
  - Traps baited with generic attractant

- 2016: dropped visual inspection component
- 2018: manuka oil/ethanol as bait for EAB
- 2019: hexenol/lactone bait as bait for EAB
- 2022: ringbarking of birch trees as baits for BBB

Surveys for BBB and EAB - present

Surveys pest by pest when it comes to trapping as a survey method

- Work load – traps must be revisited
- Administrative demands – planning work required
- Balancing resources with regulation (*eg*. statistically based surveys for EAB in force 2027)

2025: switch to broadspectrum multilure and development of a trapping network of wood boring beetles

- Sacrificing some specificity in return for broad spectrum capacity and more traps
- Optimization considering many species of wood boring beetles

What kinds of traps do we use?

- Multifunnel Lindgren traps
  - Black
  - Green

What kinds of trap × bait combos do we use?

Trap type	Lure	Insects targeted
Green multifunnel trap	Multilure* + α-pinene + UHR EtOH	*Buprestidae*, *Cerambycidae*, *Scolytinae*
Black multifunnel trap	Multilure* + α-pinene + UHR EtOH	*Buprestidae*, *Cerambycidae*, *Scolytinae*

*Multilure composition: Racemic 3-hydroxyhexan-2-one (C6-ketol), racemic 2-methylbutan-1-ol, 2*R**, 3*S**-2,3-hexanediol, racemic fuscumol, fuscumol acetate, monochamol, geranylacetone and prionic acid

UHR = ultra high release

Combination of both understory and canopy trapping proposed as an effective optimization for generic surveillance

- Marchioro, M. *et al*. 2020 *Forest Entomology*, 113(6): 2745-2757
- Roques, A. *et al*. 2023. *NeoBiota*, 84: 169-209
- Santoiemma, G. et al. 2023. *Journal of Pest Science*, https://doi.org/10.1007/s10340-023-01728-z
- Santoiemma, G. et al. 2024. *NeoBiota*, 95: 77-95

Broad spectrum of baits assessed

- Over a 4 year period
- Part of three European research projects (HOMED, MULTITRAP, SAMFIX) and two French projects (CANOPEE, PORTRAP)
- 302 sites distributed globally:
  - 244 in Europe
  - 38 in Asia
  - 11 i North America
  - 5 in the Carribean
  - 4 in Australia
- 1308 traps in total

SBA has a supplier that sells the multilure already formulated

Roques, A. *et al*. 2023. *NeoBiota*, 84: 169-209

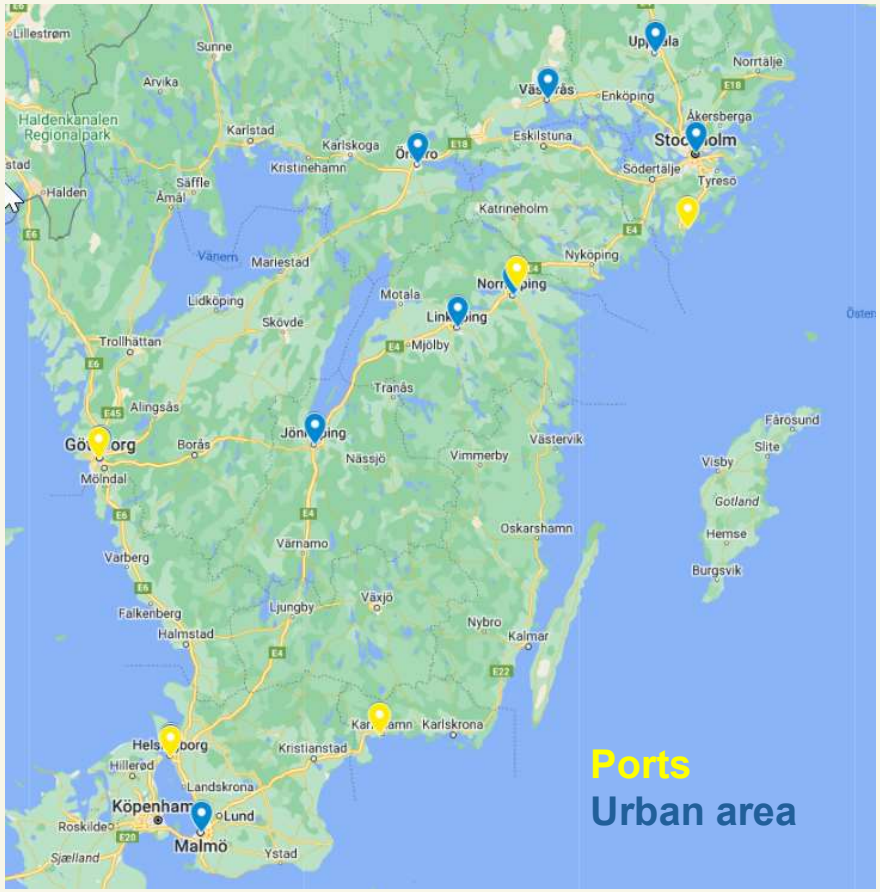
Which general sites do we place traps in?

- Ports of entry – focus on import of round wood, wood chips and containers that may hold cargo on wood packaging material
  - 5 ports in total

- In urban areas around risk locations:
  - Industrial sites
  - Recycling centers
  - Logistical hubs
  - Loading areas for goods – railway and road network
  - 10 largest Swedish cities, 10 traps per city

Geographical distribution of traps

City	Port	Urban area	No of traps
Göteborg	x	x	27
Helsingborg	x	x	27
Jönköping		x	10
Karlshamn	x		10
Linköping		x	10
Malmö		x	10
Norrköping	x	x	27
Norvik	x		10
Stockholm		x	10
Uppsala		x	10
Västerås		x	10
Örebro		x	10



How do we handle trapped insects?

- For wood boring insects we use wet trapping in propylene glycol
- Traps emptied every three weeks
- Trapped insects analysed by Mats Jonsell and his group (Swedish University of Agricultural Sciences)
  - Sorting of insects
  - Insects belonging to *Buprestidae*, *Cerambycidae*, *Scolytinae*

When do we survey?

- Black multifunnel traps, crosstraps: beginning of April through August

- Green multifunnel traps: mid-May through August

Future surveys?

- SBA has participated in large study coordinated by Dr Rassatis group at the University of Padua
  - Multi-colored panel traps – possibility to further tweak trap colors in generic surveillance program?
- More automated detection of insect pests and identificiation of samples needing further scrutiny
- Lidar-based detection in cases of specific pests and in outbreak situations

Contingency plans BBB and EAB


1(44)

Beredskapsplan för Agrilus anxius

Diarienummer: 6.9.17-10310/2022

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Bilaga till Jordbruksverkets beredskapsplan för växtskadegörare


1(50)

Diarienummer
6.9.17-10310/2022

Beredskapsplan för smaragdpraktbagge

Bilaga till Jordbruksverkets beredskapsplan för växtskadegörare

Fastställd den 7 januari 2026

- Generell beredskapsplan växtskadegörare
- Beredskapsplan Kopparpraktbagge
- Beredskapsplan Agrilus planipennis 2.0

Key elements

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Simulation exercises

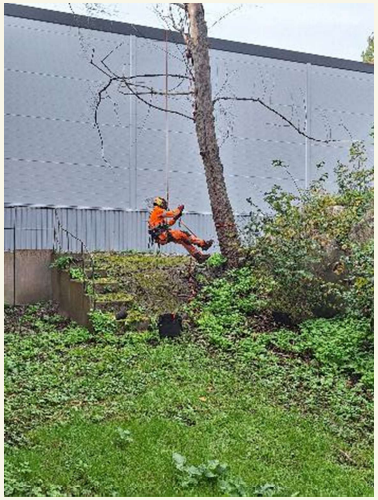
- Bench-top simulations using different scenarios
  - Testing contingency plan and processes therein
    - Focus on specifik tasks like decisions on phytosanitary action, communication etc
    - Practicing division of labor between the different functions of a crisis organisation (SBA follows NATO-organization)
  - Multi-agency cooperation
    - Swedish Forest Agency

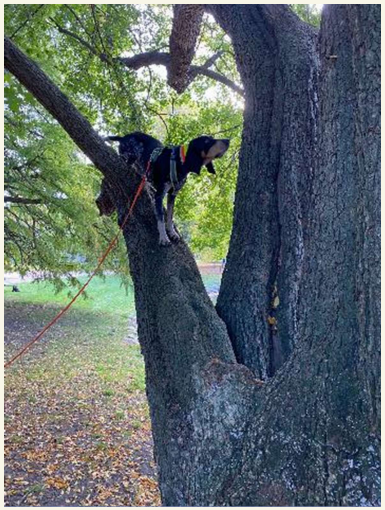
- One physical simulation
  - Survey of felled material and delimiting survey
  - On site actions

Interplay between survey and contingency work

- Simulation exercises expose strenghts but also areas needing improvement

- Surveys partly employed as embedded contingency preparedness
  - Sniffer dogs
  - Tree climbers





Questions?