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Contingency planning for vector-borne diseases, a Swedish perspective.



Listed VBDs

Name of disease	AHL category	Species (SE)	vector	epizootic disease in SE
Bluetongue serotype 1-24	C+D+E	Antilocapridae, Bovidae, Camelidae, Cervidae	Culicoides spp. (biting midges)	Yes Until BTV-3 outbreak 2024
Epizootic haemorrhagic disease virus	D+E	Antilocapridae, Bovidae, Camelidae, Cervidae,	Culicoides spp.	No
African horse sickness	A+D+E	Equidae	Culicoides spp.	Yes
Rift valley fever	A+D+E	Antilocapridae, Bovidae, Camelidae, Cervidae,	Culicidae (mosquitoes)	Yes
Japanese encephalitis	E	Equidae	Culicidae	Yes
West Nile fever	E	Equidae, Aves	Culicidae	Yes until 2025
Venezuelan equine encephalomyelitis	D+E	Equidae	Culicidae	Yes
Equineencephalomyelitis (Eastern and Western)	E	Equidae	Culicidae	Yes
African Swine fever	A+D+E	Suidae	Ornithodorus (soft ticks) also direct transmission	Yes
Equine infectious anemia	D+E	Equidae	Tabanidae (horse-fly)	Yes
Surra	D+E	Equidae, Artiodactyla	Tabanidae	No
lumpy skin disease virus	A+D+E	Bison ssp., Bos ssp., Bubalus ssp	Haematophagus arthropods (blood feeding insects)	Yes

Outbreak experience and learning

- **Bluetongue serotype 8 outbreak 2008-2010 -successfully eradicated**
- **Bluetongue serotype 3 outbreak 2024 –ongoingt**
- **Schmallenberg virus outbreak 2012 – recurring now**

Bluetongue BTV-8 and BTV-3



Bluetongue serotype 8 outbreak 2008-2010

Wind borne vectors from affected areas in other MS.

The outbreak: 31 establishments found using specific surveillance in 2008. No clinical cases, No signs of virus circulation.

- Effective and early detection possible with bulk milk surveillance.
- Compulsory vaccination of all bovine and ovine herds with 10 or more individuals for two years was successful.
- Vector monitoring for 3 years to define vector free period.

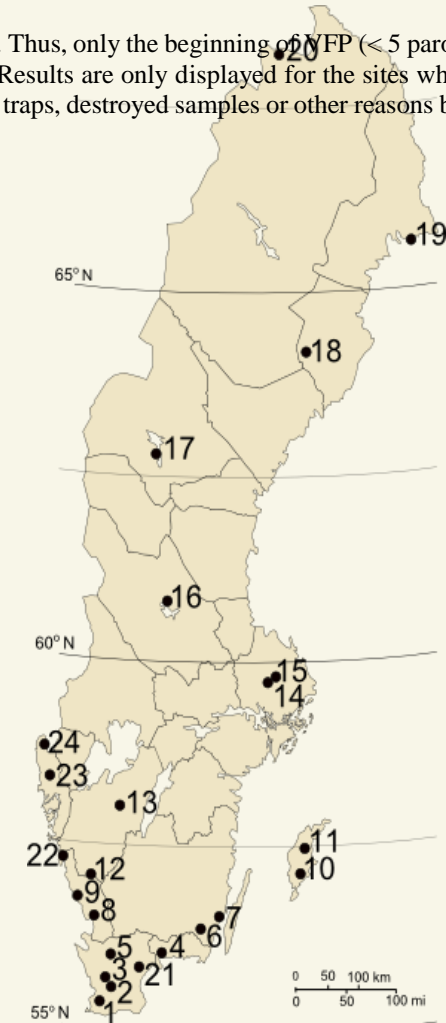
Vector detection for vector free seasons

- Enable safe trade in animals
- Reliable data?

The Swedish survey of Bluetongue-vectors was implemented on the 22nd of July 2007. Thus, only the beginning of VFP (< 5 parous *Culicoides*/trap/night) could be established for that year. A total of 24 sites have been surveyed since 2007. Results are only displayed for the sites where end and beginning of VFP were possible to establish. Thus, excluded data are due to technical problems with traps, destroyed samples or other reasons beyond control to perform sampling.

Table 1
Sampling sites of *Culicoides* 2007-2010

No.	Site	Province	Coordinates EU-BTNET [x, y]	
1	Bara	Skåne	13,209502	55,590624
2	Löberöd	Skåne	13,542875	55,755854
3	Svalöv	Skåne	13,091801	55,915806
4	Svängsta	Blekinge	14,715195	56,301630
5	Vittsjö	Skåne	13,701596	56,334670
6	Torsås	Småland	15,825888	56,354064
7	Ljungbyholm	Småland	16,213806	56,529475
8	Halmstad	Halland	13,171200	56,672436
9	Falkenberg	Halland	12,528541	56,918072
10	Hemse	Gotland	18,360799	57,210810
11	Romakloster	Gotland	18,494280	57,377366
12	Torestorp	Västergötland	12,658971	57,404260
13	Axvalla	Västergötland	13,718974	58,456779
14	Uppsala LH	Uppland	17,750151	59,812581
15	Uppsala BO	Uppland	17,750151	59,812581
16	Orsa	Dalarna	14,631517	61,147317
17	Oviken	Jämtland	14,470597	63,079
18	Lycksele	Västerbotten	18,669678	64,595375
19	Kalix	Norrbotten	23,605450	65,745869
20	Abisko	Lappland	18,748908	68,349000
21	Kristianstad	Skåne	14,189182	56,081574
22	Fjärås	Bohuslän	12,149112	57,446935
23	Dingle	Bohuslän	11,583443	58,581520
24	Strömstad	Bohuslän	11,352678	58,955886



Culicoides vectors: Vector free period 2008-2010

- **Historical vector free periods in Sweden:**
- **2008-2009: 15 November 2008 - 21 April 2009**
- **2009-2010: 1 November 2009 - 28 May 2010**
- **2010- start 25 October 2010 –**
- **December 2010 -SE declared free from BTV-8**

Compulsory vaccination

The vaccination campaign
in 2008-2010 was
successful.



Are vaccines responsible for production loss after vaccination?

Result on specific study on dairy cattle data

- "No signs that vaccination against bluetongue 8 caused any production loss in dairy herds.
- Caveat: due to insufficient data, potential effects on fertility and culling after the second vaccination cannot be ruled out."

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Bluetongue serotype 8 outbreak 2008-2010

An economic analysis 2010

Is Bluetongue eradication worthwhile?

- **Diana Viske**, *DVM* (Department for Animal Welfare and Health)
- **Bo Norell**, *Agro-Economist* (Crop Production Department)
- **Janne Johansson**, *Reimbursement administrator, math teacher* (Department for Rural Development)
- **Lars Pettersson**, *Economist* (Department for Rural Development)
- **Lars M Widell**, *Economist* (Market Department)

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Aim of the analysis

- To show possible economic consequences of endemic Bluetongue in Sweden
- To give guidance for Swedish decision- and policy-making on Bluetongue control from an economic perspective



Calculation of costs for endemic Bluetongue in Sweden 2008

National data on

- morbidity and mortality (no)
- production losses (no)
- rate of disease spread (no)
- incursion area (yes)
- Vaccination (yes)



General conclusions

- Free distribution of the disease would affect both dairy herds and sheep flocks with large losses. (60 million SEK/year for 20 years)
- Disease freedom has high economic value — compulsory vaccination is often cost-effective even for reoccurring disease in a smaller region.
- If widespread introductions of the virus occur annually, voluntary vaccination becomes a more viable strategy.
- Voluntary vaccination is mainly profitable in dairy herds, and only if farmers are allowed to vaccinate their own animals.
- From an animal welfare perspective, all livestock owners should be encouraged to vaccinate.

Impact of AHL categorisation of BTV 1-24 on BTV contingency planning

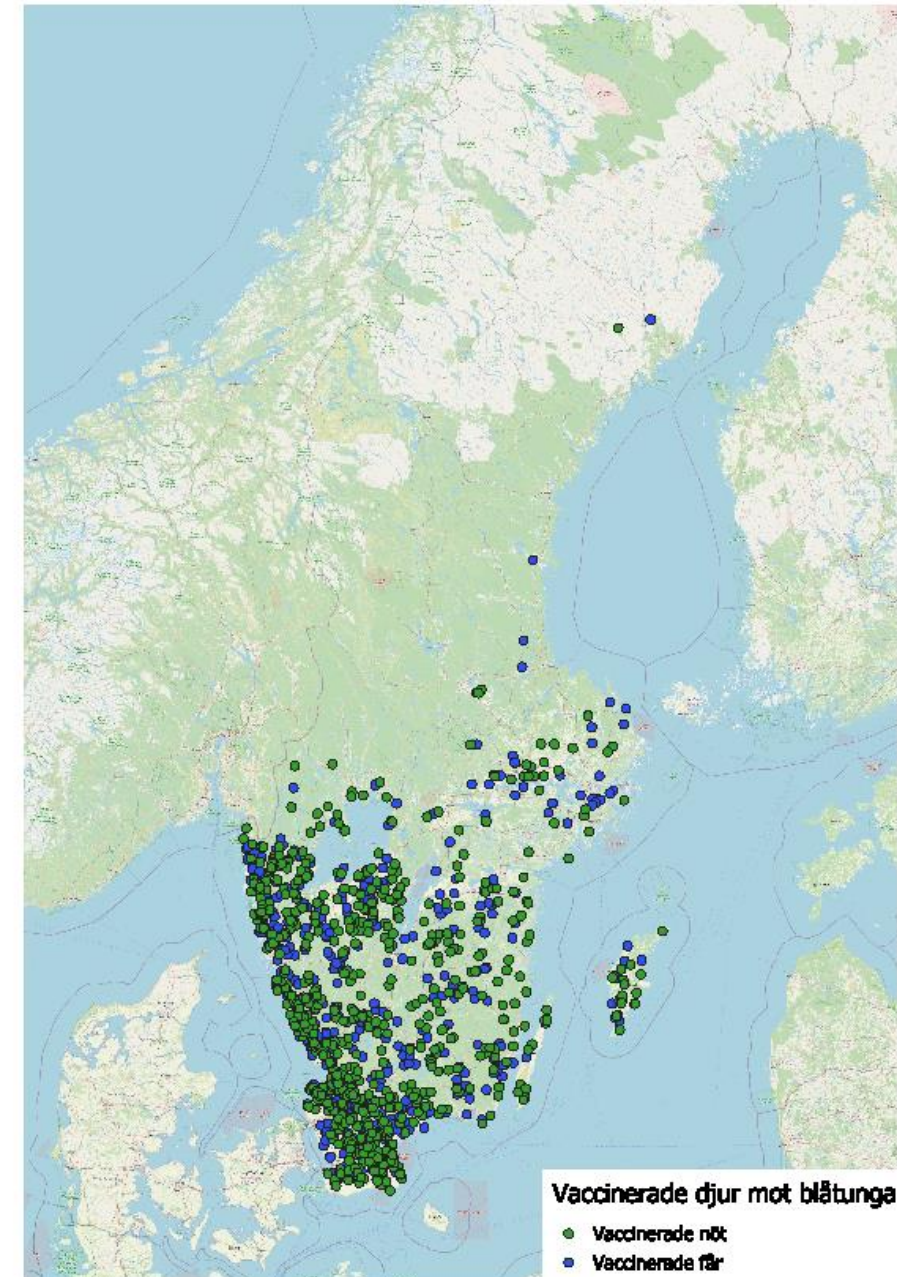
- Coordinated vaccinations between MS for eradication purposes not on the table.
- Elevated risk of recurring incursions with possibly endemic BTV serotypes in nearby countries.
- Need to develop sustainable national vaccination strategy possibly including prophylactic vaccination of animals.

Bluetongue serotype 3 outbreak 2024 – actions taken

- **Voluntary vaccination was allowed through change in legislation.**
- **Mandatory registration of vaccinated animals (will to vaccinate and for surveillance).**
- **Animal owners allowed to vaccinate themselves after being taught proper technique. (cost reduction)**
- **Surveillance:**
 - **Mandatory reporting of suspected index case in every herd.**
 - **Veterinary visits for sampling clinical suspicions financed by SBA until march 2025 after that only the analyses are financed.**
 - **Surveillance for other serotypes (PCR and serological)**
 - **Surveillance to assess spread.**
- **Active promoting vaccination to protect animals, information, webinars and other. Information, webseminars for veterinarians and stakeholders. Joint groups of veterinary services for the purpose of advising on vaccination. Information also on the similarities of BTV and FMD.**

Registered vaccinations BTV-3

- Sheep
 - Vaccinated flocks: 584
 - Vaccinated animals 33 675 (11%)
 - Total number of sheep in Sweden 312 000
- bovines
 - Vaccinated herds: 799,
 - Vaccinated animals 87881 (6-7%)
 - Total number of bovines in Sweden 1 333 800
- Registered until May 2025



Not enough vaccine?

- Few vaccinations in autumn,
- Combined effort by veterinary services to inform on disease and emergency vaccine.
- Vaccine ordering higher in spring possibly aided due to much reporting of dummy calves.
- Vaccine deliveries delayed
- Late release of animals to pasture due to voluntary vaccination

Schmallenberg in Sweden

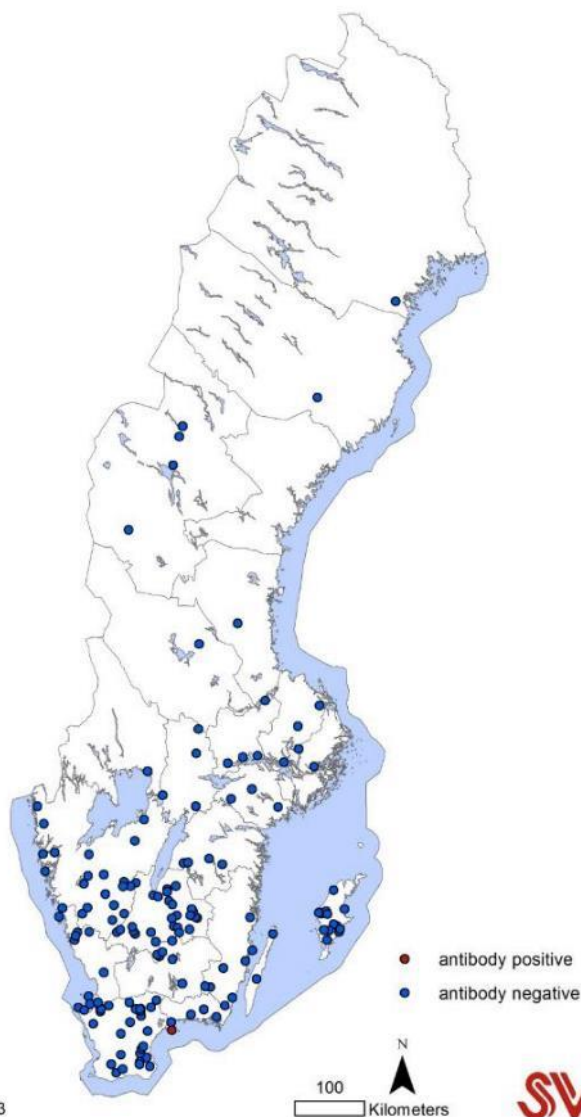


**Sheep: Frozen
blod collected fall
winter 2011-2012
from 150 farms,
tested for SBV.**

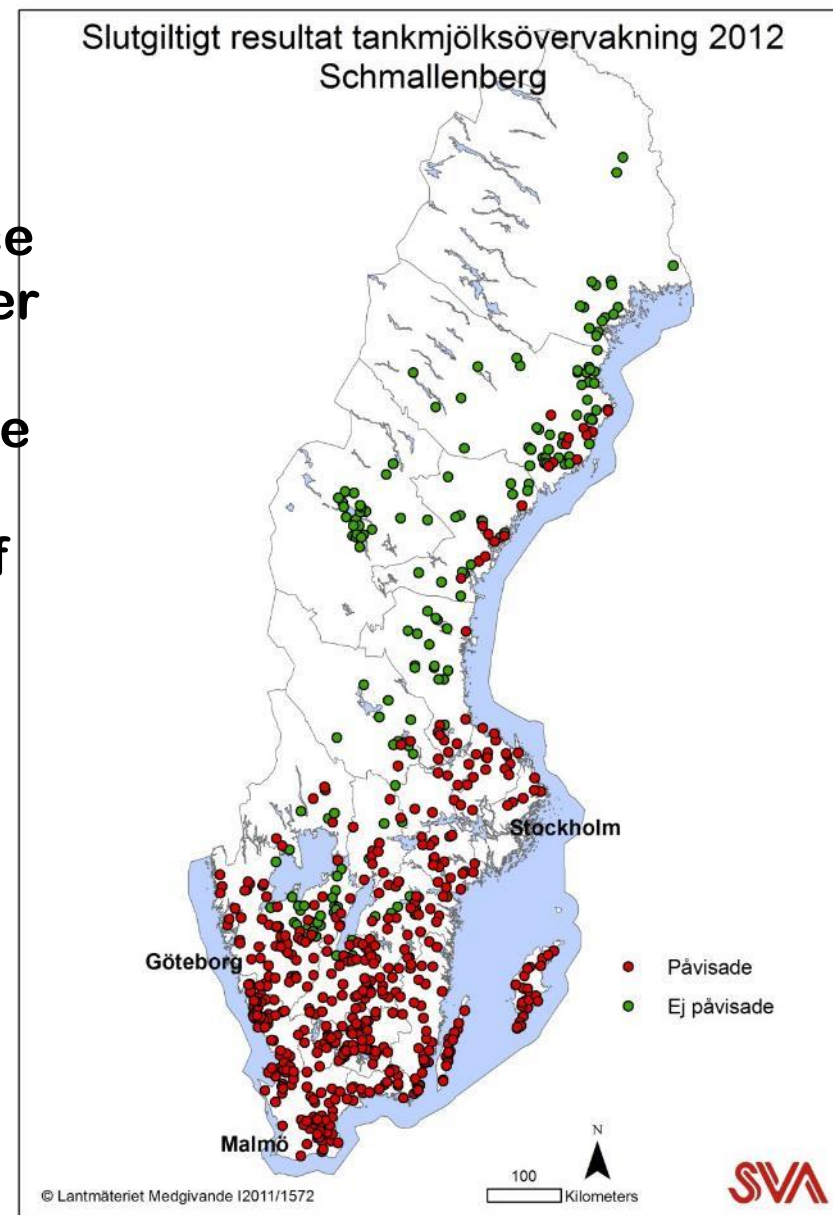
**One positive test
in Blekinge county**

**Cattle: Bulk milk
surveillance in
maj-june 2012,
750 farms.**

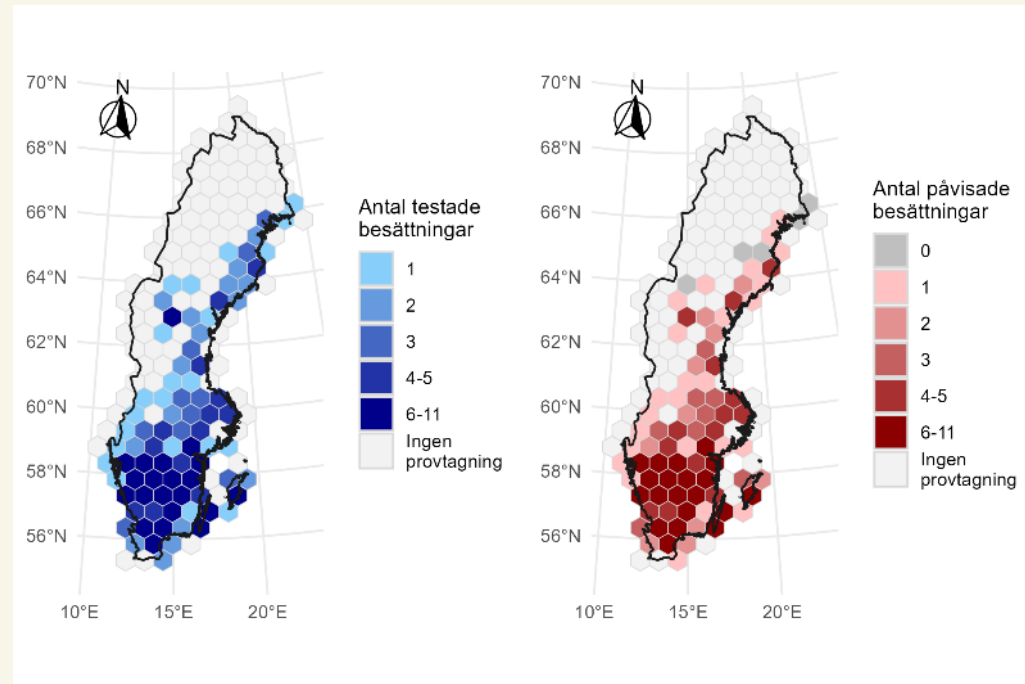
**One positive test
in Blekinge county**



**Bulk milk
surveillance
in november
2012:
520 positive
bulk milk
tests out of
723**



Schmallenberg in Sweden today.



- 2024 (results from SVAs webb)
- Few clinical cases, cyclic reapperence.
- Not a classified disease.
- Endemic ?
- Schmallenbergvirus hos idisslare - SVA

Summary outbreak experience and contingency planning

- **Bluetongue serotype 8 outbreak 2008-2010 -successfully eradicated**
- **Schmallenberg virus outbreak 2012 – recurring**
- **Bluetongue serotype 3 outbreak 2024 – most likely ongoing**
 - **Learning experience still**
 - **Need more data on economic impact**
 - **Look into options for promoting vaccination**

Thank you for your attention

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