# The role of tabanids as potential African swine fever vectors in Estonian wild boar habitats: preliminary results

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## BACKGROUND

Trace amounts of African swine fever virus (ASFV) DNA have been detected in insects collected in 2016 from an infected pig farm in Estonia ([1]) and in 2019, in several farms in Lithuania ([2]). It has been experimentally demonstrated that stable flies (*Stomoxys calcitrans*) can transmit ASFV within a short period of time ([3]).

Tabanids are haematophagous flies and mechanical vectors for many infectious diseases, they should be considered as potential mechanical vectors for ASFV.

**AIM OF THIS STUDY - to determine via DNA analysis which tabanid species feed on the wild boar (*Sus scrofa*)**

## MATERIAL AND METHODS

- Location: Wild boar baiting sites in Emmaste, Hiiumaa, Estonia
- 2 collection years: 2019 and 2020
- 4 collection periods in June, July and August
- 4 collection sites
- 4 trapping methods

- Infrared cameras to confirm wild boar in the area

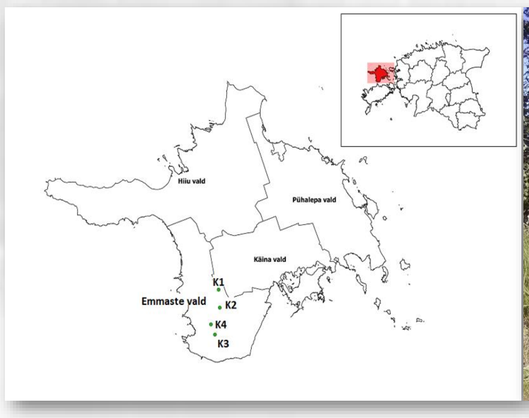


**Figure 2**. Tabanid collection sites in Hiiumaa, Estonia, 2019 and 2020.

**Figure 3**. Trap placement in collection site 1. Nzi trap in the foreground, H-trap in the far right.

**2019**

- One H-trap and one water tray per site

**2020**

- One H-trap + one Nzi-trap site.
- Entomological net catches by 2 persons, per 20 minutes once a day
- All traps urine-baited

- Storage: 75% ethanol; net caught tabanids stored dry in -20°C.
- All specimens morphologically identified to genus or species level.
- Homogenisation: individual or pooled (max no. 5 specimens) samples

**Figure 4**. Female *Tabanus bromius* specimens.

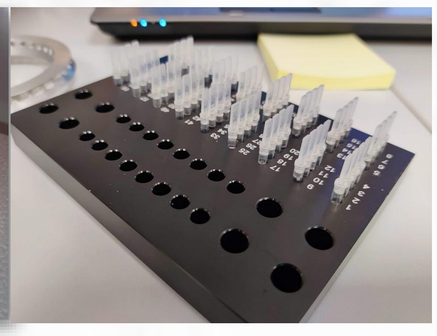

**Figure 5.** DNA samples to be analysed by real-time PCR (RotorGene Q (Qiagen, Germany)).

- **DNA samples analysed by real-time PCR for the presence of suid-specific cytochrome b (*cyt-b*) gene**
- Fwd. primer 5'-CCTCGCAGCCGTACATCTC-3'
- Rev. primer 5'-ACGTAGAATAGCGTAGGCGAATAA-3'
- Probe 5' FAM-TCCTGCACGAAACCGGATCCAACAAC-BHQ-1 3' ([4])

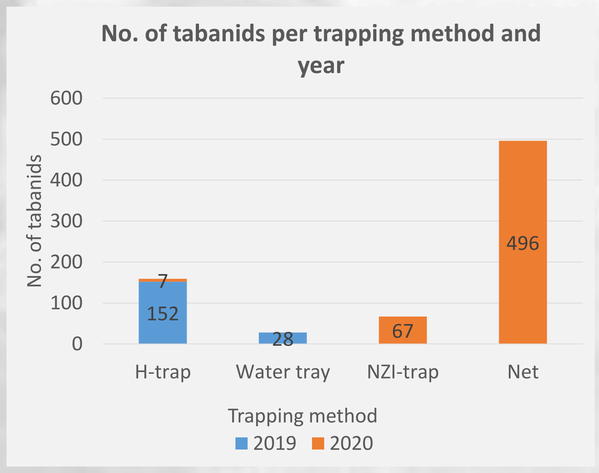


**Figure 6**. Total number of tabanids per trapping method and year. H-traps and water trays were utilised in 2019; H-traps, Nzi-traps and net catches in 2020.

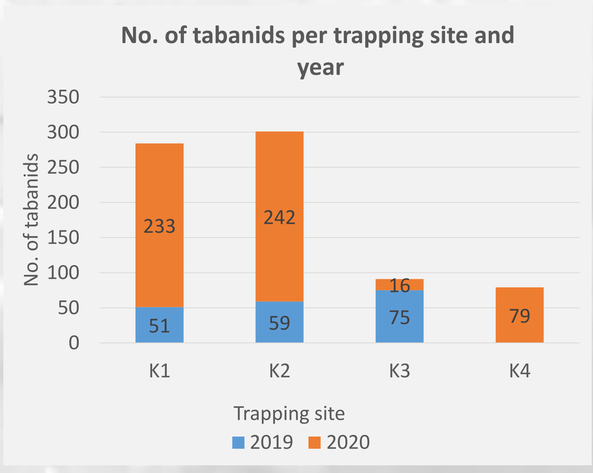


**Figure 7**. Total number of tabanids by trapping site and year. In 2020, site K3 was switched to site 4 after one day of collection due to no evidence of wild boar in the area.

**Table 1**. Tabanid species captured from three locations near wild boar baiting sites in Estonia, 2019 and 2020, and cytochrome b PCR analysis results.

| | | 2019 | 2020 | Total (% total) | No. tested for *cytb* (no. pos) |
|---|---|---|---|---|---|
| **Genus** | **Species** | | | | |
| ***Atylotus*** | *A. fulvus* | 1 | - | 1 (0.1%) | **1 (0)** |
| | *A. plebeius* | 2 | - | 2 (0.3%) | **2 (0)** |
| ***Haematopota*** | *H. crassicornis* | - | 4 | 4 (0.5%) | **4 (0)** |
| | *H. pluvialis* | 166 | 553 | 719 (95.5%) | **719 (0)** |
| ***Heptatoma*** | *H. pellucens* | 1 | - | 1 (0.1%) | **1 (0)** |
| ***Hybomitra*** | *Hybomitra spp.* | 13 | - | 13 (1.7%) | **13 (0)** |
| ***Tabanus*** | *T. bovinus* | - | 10 | 10 (1.3%) | **10 (0)** |
| | *T. bromius* | - | 1 | 1 (0.1%) | **1 (0)** |
| | *T. maculicornis* | - | 2 | 2 (0.3%) | **2 (0)** |
| | | **183** | **570** | **753** | **753 (0)** |

-- indicates no individuals of the species being caught

## PRELIMINARY RESULTS AND CONCLUSIONS

- 753 individual tabanids were captured over the study period.
- 96% of all tabanids caught belonged to genus *Haematopota.*
- The most effective way of collection was entomological net, yielding 496 tabanids in total (65.9% out of all tabanids caught in all periods) over 6 collection days.
- **None of the tabanids tested positive for wild boar contact, suggesting that tabanids don't play a significant role as wild boar pests and therefore as potential mechanical vectors for African swine fever.**

## A WORK IN PROGRESS: 2021

- Wild boar baiting sites: 6 sites in Tartumaa, Estonia; collection period 6 weeks.
- Commercial pig farms: 2 farms in Tartumaa, collection period 6 weeks: collection and identification of tabanids to determine their species diversity and relative abundance.
- All captured tabanids to be tested for wild boar/ pig contact by *cyt-b* PCR.

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**References**

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