AHW.A.06

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SCIENTIFIC REPORT ON RISK FACTORS FOR AFRICAN SWINE FEVER

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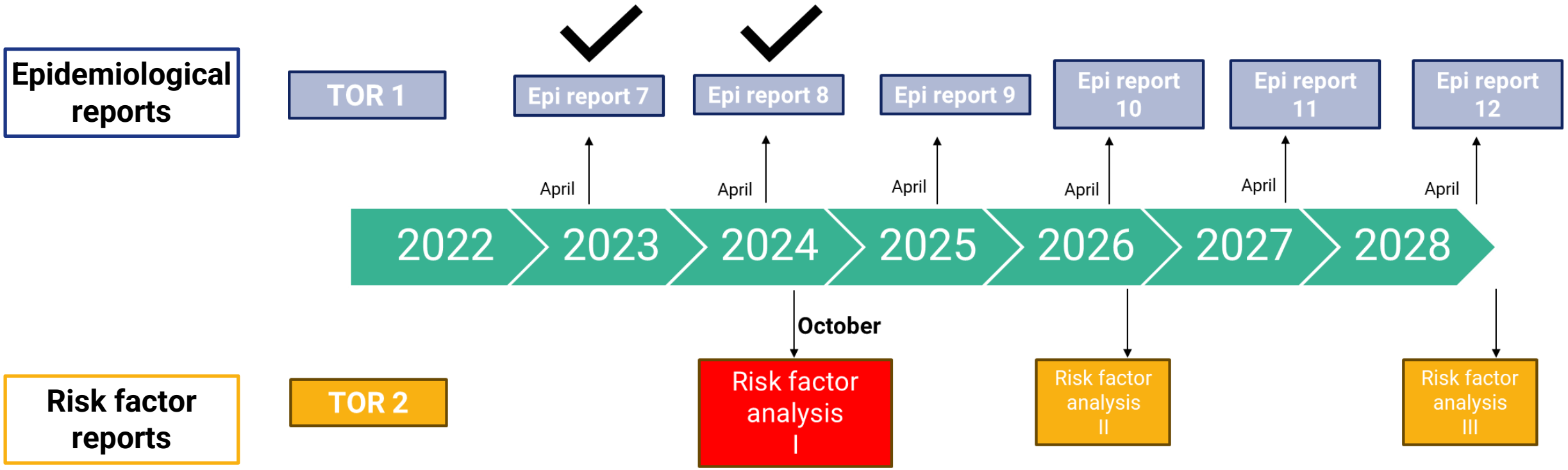
efsa

EUROPEAN FOOD SAFETY AUTHORITY

MANDATE ON ASF (2022-2028)



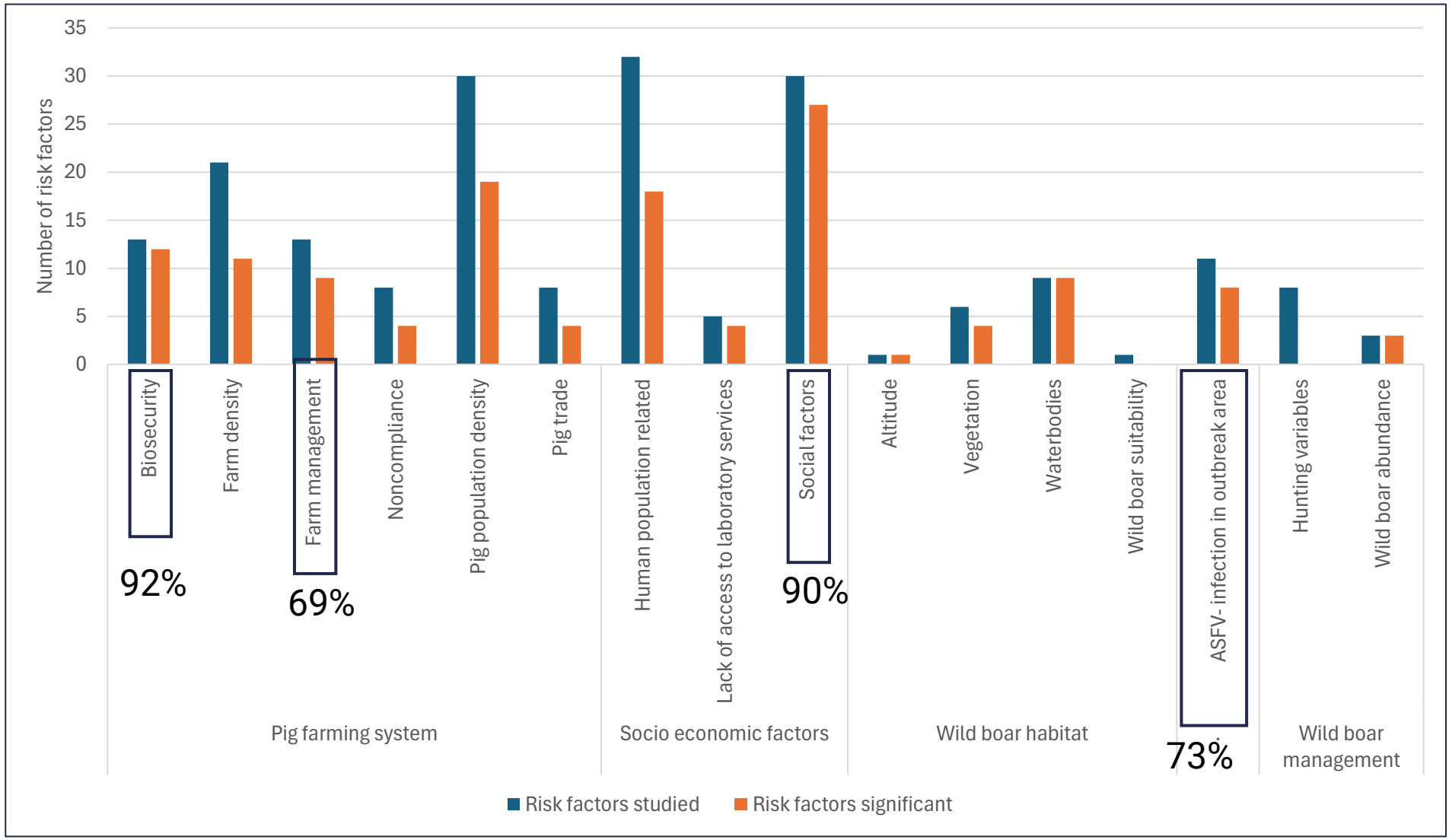
MANDATE ELEMENTS

I. Risk and protective factors of ASF in **domestic pigs**.
II. Risk and protective factors in **wild boar populations**.
III. Role of vectors (including mechanical).

IV. Effectiveness of **barriers for controlling wild boar movements**.
V. Immunocontraception as a method for controlling wild boar populations.

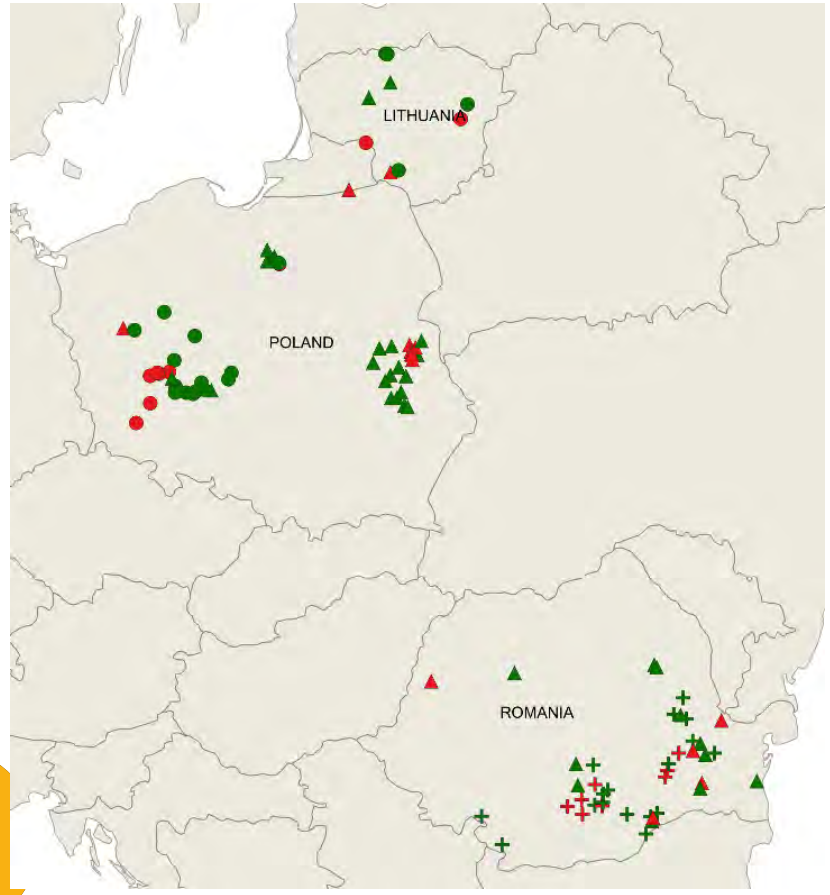
It is not a prioritization exercise

1. RISK AND PROTECTIVE FACTORS IN DOMESTIC PIGS



1. RISK AND PROTECTIVE FACTORS IN DOMESTIC PIGS

Case control study in commercial farms



Results

	Variable	OR	95% CI
Protective	Distance to the closest ASF outbreak in domestic pigs	0.09	0.02 - 0.4
Protective	Use of insect nets on all windows and air intake	0.22	0.05 - 0.99
Risk	Manure from other holdings spread within 500 m from the farm	6.72	1.34 - 33.83
Risk	Presence of bedding material	8.65	1.35 - 55.53

1. RISK AND PROTECTIVE FACTORS IN DOMESTIC PIGS

Conclusion

- Risk factors for domestic pigs:
  - Biosecurity and social factors
  - Farm management:
    - spread of manure around farms, bedding materials, use of insect nets
  - Close proximity to ASF-outbreaks

Recommendations

- Strict biosecurity measures
  - Safe storage of bedding material
  - Especially where ASF present
- Insect screens as an additional protection where ASF is present in the surroundings.

2. RISK AND PROTECTIVE FACTORS IN WILD BOAR

1. Update of the Systematic **Literature** Review

2. Risk factors for **occurrence**

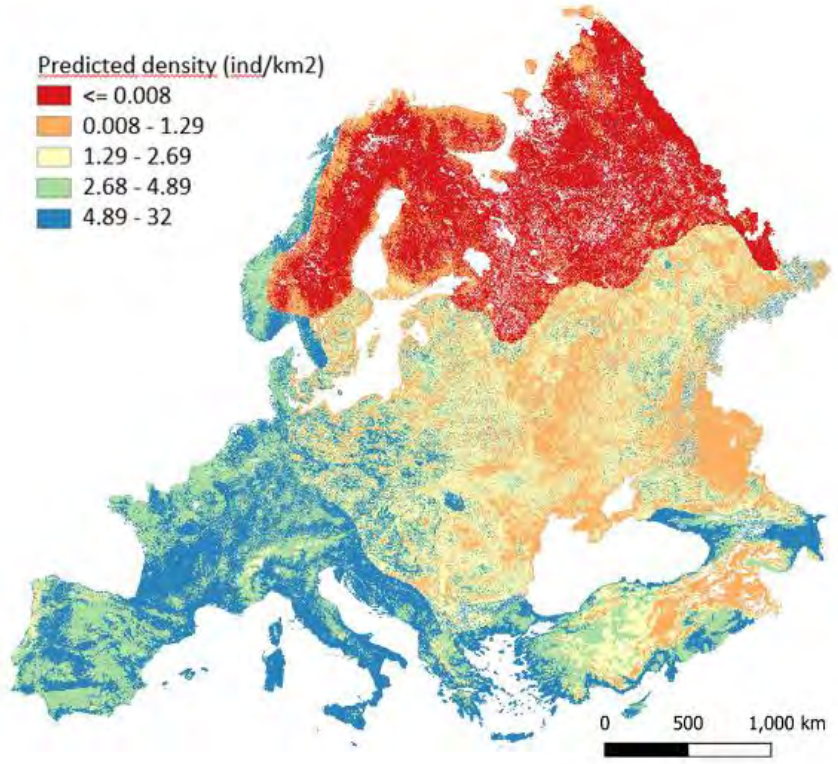
3. Risk factors for **persistence**

Spatial statistical models
LV, LT (IT, SE)

4. Risk factors for **spread**

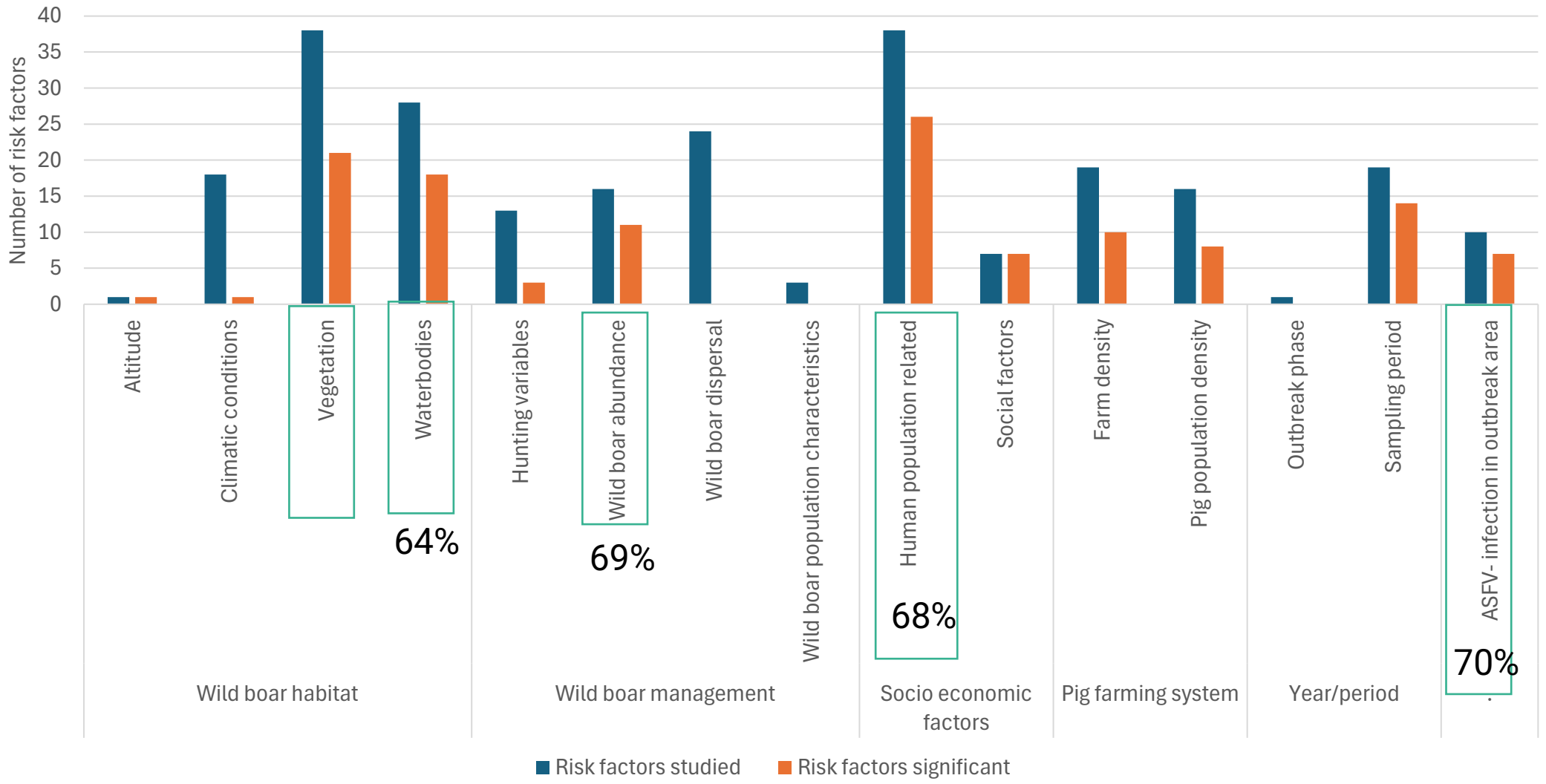
→Transmission model in IT

Wild boar density data 2x2km



Source: Enetwild, 2024

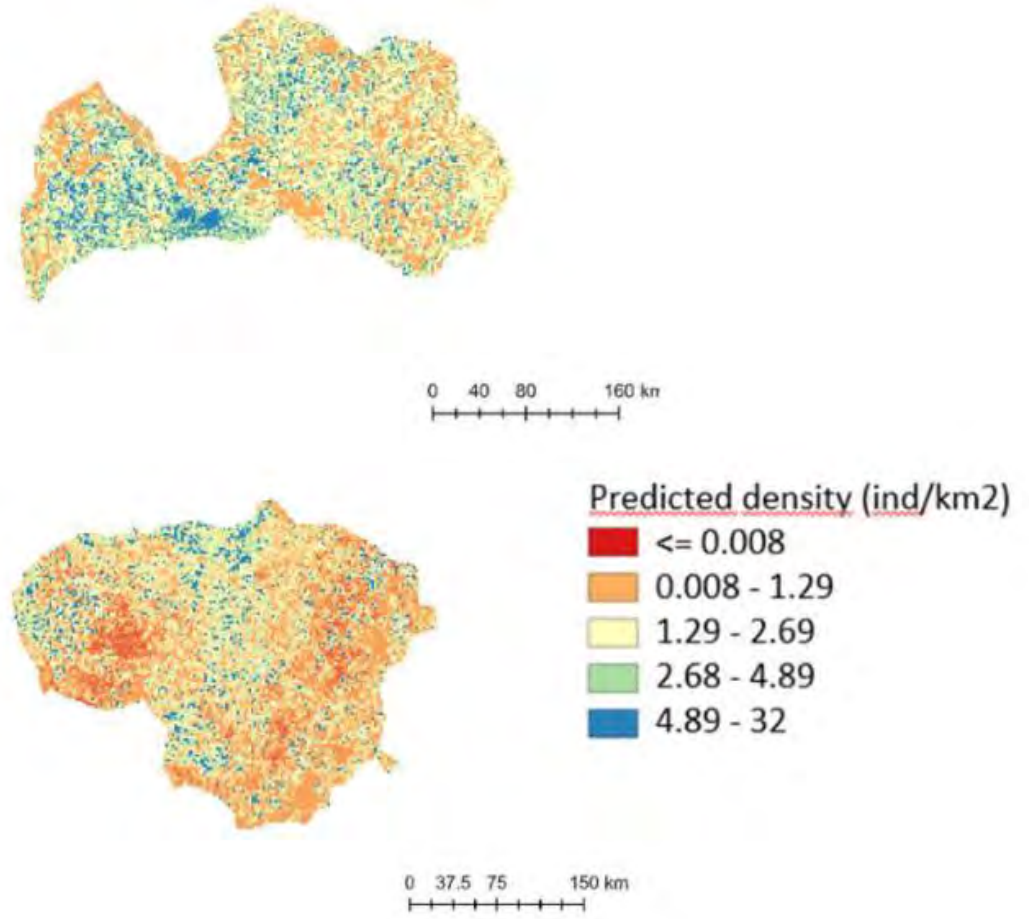
2. RISK AND PROTECTIVE FACTORS IN WILD BOAR



2. RISK AND PROTECTIVE FACTORS IN WILD BOAR

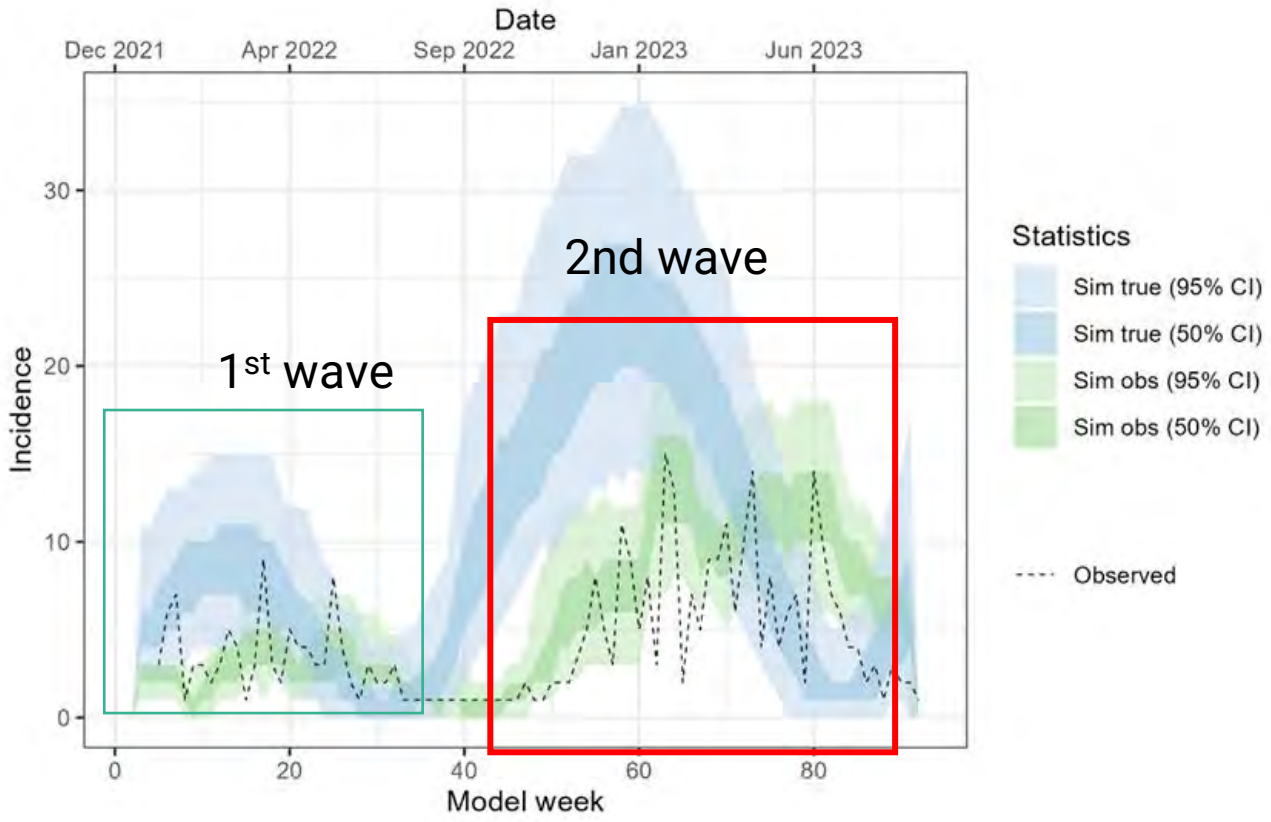
	Occurrence	Persistence
Climatic factors	++	++
Forest indicators	++	++
Potential barriers	-	++
Wild boar density	+	-
Scenarios analised	Latvia Lithuania (96%) +Sweden, Italy	Latvia and Lithuania

Wild boar predicted density in Latvia and Lithuania

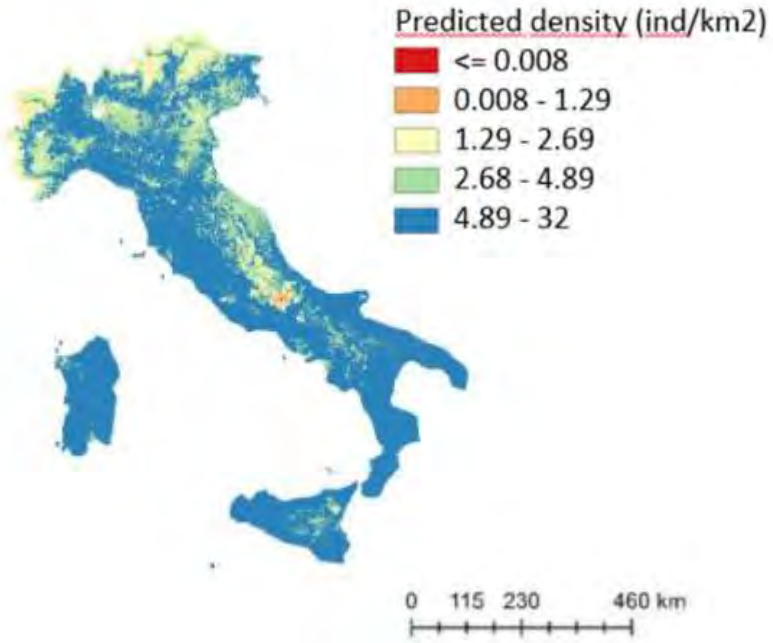


2. RISK AND PROTECTIVE FACTORS IN WILD BOAR

SPREAD in Northern Italy



Wild boar predicted density in Italy



2. RISK AND PROTECTIVE FACTORS IN WILD BOAR

Conclusions

- Wild boar density significant in literature review and historically
- No clear effect and consistent effect on ASF in selected scenarios:
  - Moderate effect in occurrence
  - Wave-specific effect in Italy only during the second wave
- Other factors: habitat, climate and potential barriers (population continuity)

Recommendations

- Further studies: same methodologies in different context
- Field data in a harmonised way
- Better wild boar density estimates

3A. ROLE OF BIOLOGICAL VECTORS ON ASF IN EUROPE

Ornithodoros erraticus is the only known biological vector in Europe

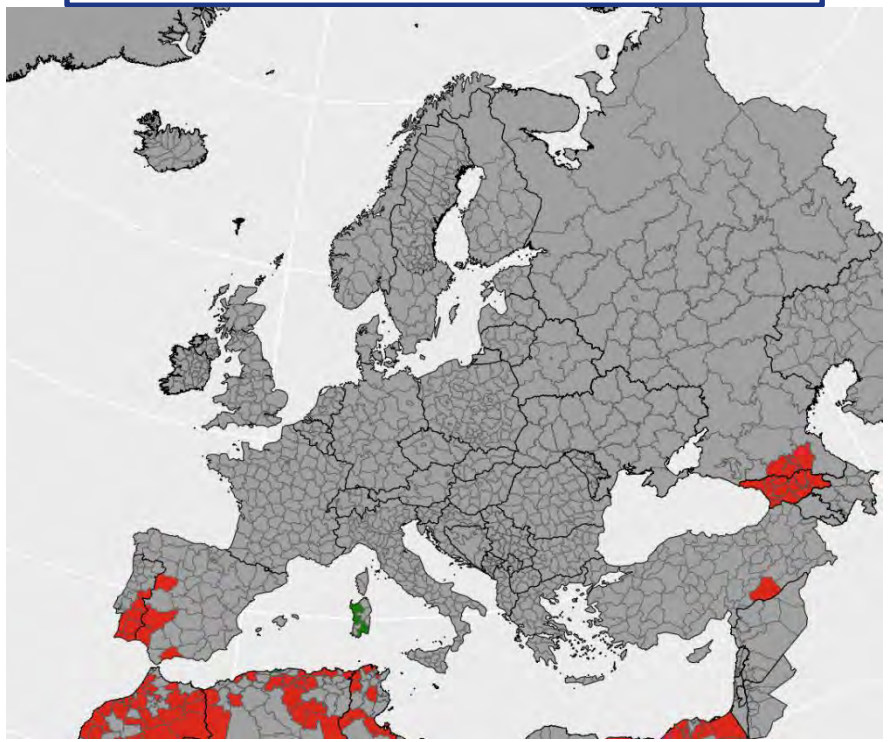
Species	Identified hosts	Habitat
O. capensis	Birds	Sea birds' nets and burrows
O. coniceps		Nests, cliffs, wells, caves, ravines, stables
O. maritimus		Bird nests in vegetated, rocky, coasts and cliffs
O. lahorensis	Sheep, camels, cattle, goats, horses, donkeys, dogs, rabbits	Stables and animal houses, in bricks and stones
O. alactagalis	rodents, badgers, foxes, hedgehogs and lizards	Moist burrows
O. tholozani	Sheep, goats, porcupines, hedgehogs, badger, camels, rodents and cattle	Crevices in caves and ruins. Animal shelters and burrows
O. verrucosus	Rodents (ground squirrels, marmots and hamsters)	Cliffs, burrows, nest and caves
O. erraticus complex	**Pigs,** cattle, rabbits, humans and sheep	Holes, cracks, burrows, bird nests, walls of pig pens

Habitat *O. verrucosus* (Ukraine)

Courtesy of S.Filatov

3A. ROLE OF BIOLOGICAL VECTORS ON ASF IN EUROPE

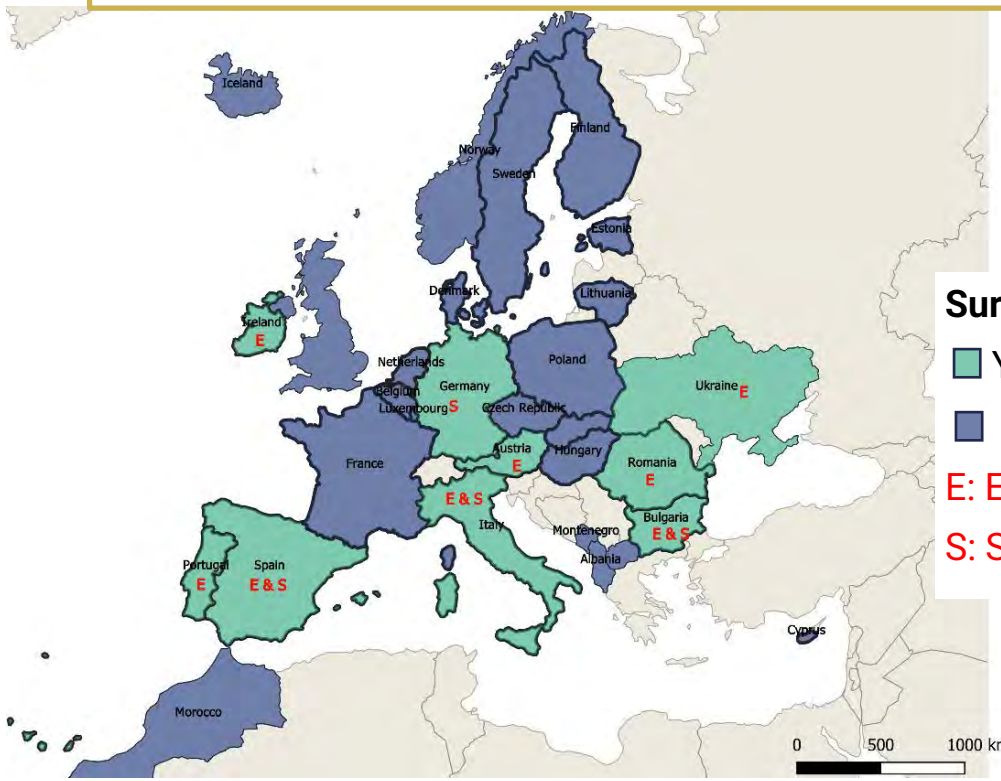
Confirmed presence of *O.erraticus*



Distribution status

- Presence
- Absence
- No data

Surveillance of *Ornithodoros spp* in Europe



Surveillance

- Yes
- No

E: Entomolgical

S: Serological

Ornithodoros erraticus played no role in the EU in the last 10 years

3A. ROLE OF MECHANICAL VECTORS ON ASF IN EUROPE

	Survival ASFV (or DNA) in the arthropod	Transmission to pigs	Detection ASFV DNA near outbreaks
Stable flies (Stomoxys calcitrans)	++	+	+++++
Horse flies (tabanids)	+?	?	++
Mosquitoes (Culicidae)	+	?	+
Midges (Culicoides)	?	?	+

Conclusions

- Stable and horse flies are exposed to ASFV in the field
- They could potentially serve as mechanical vectors of ASFV
- Uncertainty on how often this might occur

Recommendations

- Field evidence is needed
- Insect nets

4. BARRIERS FOR CONTROLLING WILD BOAR MOVEMENT

SYSTEMATIC LITERATURE REVIEW

27 publications

QUESTIONNAIRE

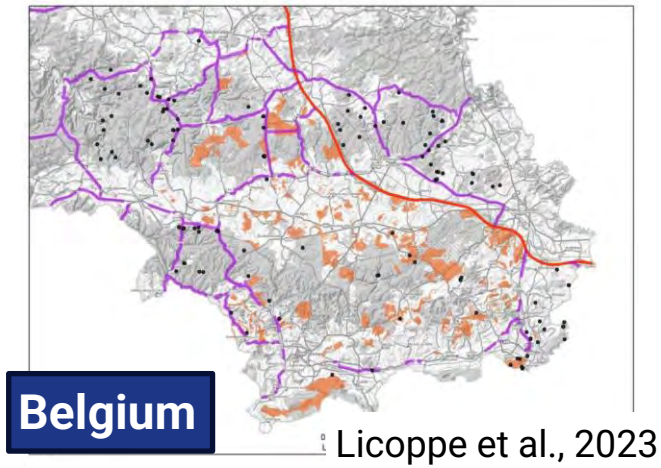
69 px
17 countries

FIELD EXPERIENCES FENCES-ASF

7 MS

FENCES

Focal fencing



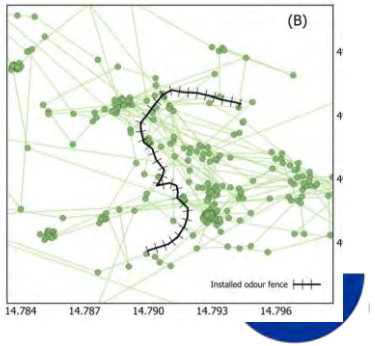
Licoppe et al., 2023

Wave-front fencing

Credits: Maja Hitij/Staff/Getty Images Europe

RIVERS

ODOR REPELLENTS



Faltusova et al., 2024

4. BARRIERS FOR CONTROLLING WILD BOAR MOVEMENT

Conclusions

- Fences combined with culling and carcass removal can be efficient if:
  - Adequate design, spatial coverage, timely implemented
  - Adaptable to ASFV spread
  - Regular maintenance (electric, more)
- In focal introductions and wave-like fronts

Recommendations

- Local epidemiological context is essential for designing fencing system
- Odour repellents alone not recommended

5. IMMUNOCONTRACEPTION FOR CONTROLLING WILD BOAR POPULATIONS

Gonadotrophin Releasing Hormone (GnRH)

- Injectable vaccine → successful in experimental & field
- 1 experiment on **oral formulation on pigs**

System to deliver baits to wild pigs

Campbell et al.2011

Conclusions

- GnRH vaccines have a potential as a complementary tool
- Oral vaccine require substantial additional work

Recommendations

- More research for safe, efficient oral vaccine
- long term implications: environment, legislation, social acceptance

CONCLUSIONS

- **Biosecurity and farm management:** essential to control ASF in domestic pigs
- **Wild boar density**: relevant but not clear/constant effect
- ***O. erraticus*** did not play a role in the EU in last 10 years
- **Mechanical vectors** could potentially transmit ASFV but extent unknown
- **Fences** can contribute to control, including in wave-front scenarios
- **Immunocontraception** has potential, but still important work missing

Importance of data collection, monitoring and reporting to keep on building knowledge

THANK YOU

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