

HOW TO ASSES RABIES SURVEILLANCE SYSTEM?



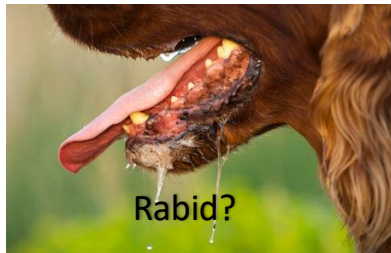
Reliability of a surveillance system

Laboratory result:

- Use of WHO/WOAH/EURL recognised techniques
- ISO 17025 Quality Accreditation of labs:
 - participation in rabies diagnosis PTL (EU and national)
 - highly qualified staff
 - validated tests
- EURL Case confirmation for specific cases

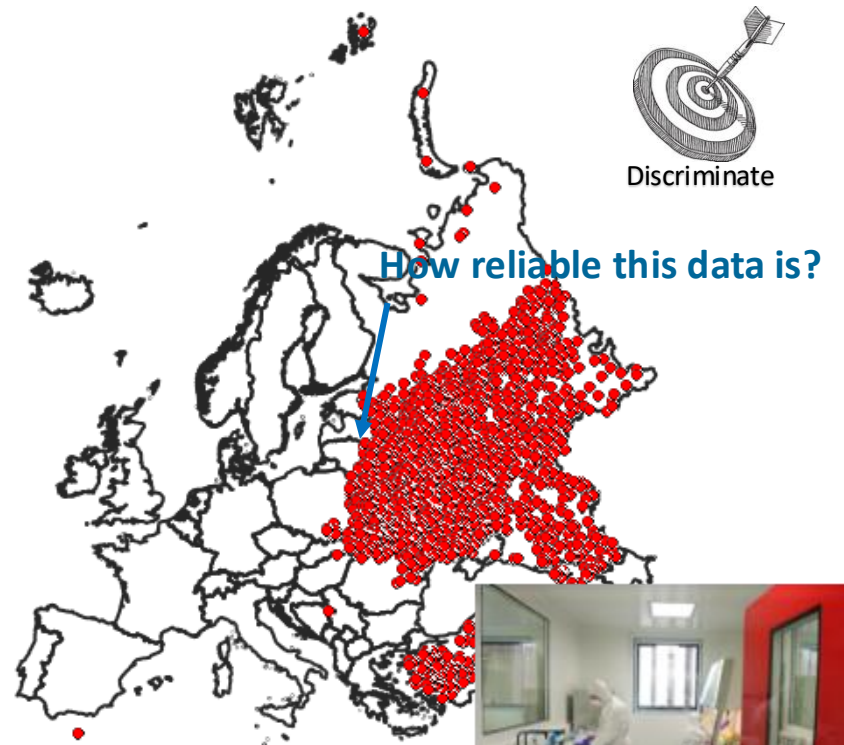
Objective:

To decrease risk of false positive
and false negative results



Specificity-Sensitivity

How to assess rabies surveillance system?

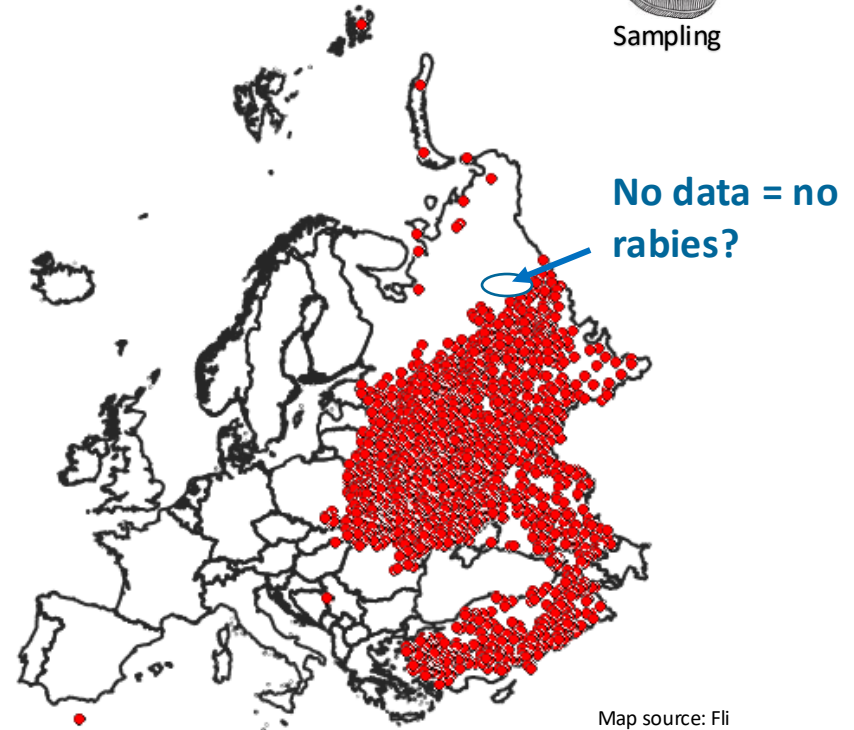


Adequacy of a surveillance system

Surveillance evaluation:

- Is surveillance pressure enough regarding the size of the reservoir population?
- Is awareness campaign sufficient enough? (KAP studies)
- Key role of National Veterinarian Services

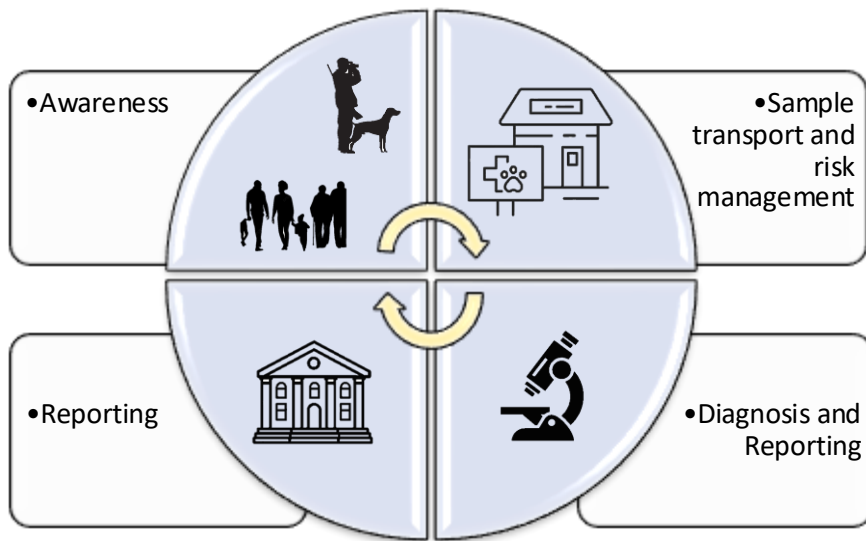
Objective:
To achieve a
sufficient level
of surveillance
to refine the
burden and
distribution
limits of
Rabies



Surveillance of rabies in the European Union

Notifiable disease of B category (Annex II of Animal Health Law, regulation 2016/429)

THE VIRTUOUS CYCLE OF THE SURVEILLANCE



Reminder: Passive vs active surveillance in the frame of Rabies

PASSIVE SURVEILLANCE

All the country – All the year

Suspect or “indicator animals” are animals that show clinical signs or abnormal behaviour suggestive of rabies, animals found dead, road-kills and animals involved in human exposure.

EC, 2021 (Doc n°SANTE/2021/10502); WOAH WHO

ACTIVE SURVEILLANCE

In ORV areas – 1 month after ORV

Primary objective: to assess specific research study or to evaluate vaccination efficiency at pop. Level (ORV monitoring)

The diagnosis analysis on this sampling is opportunistic and should not constitute an objective in itself.

Fox rabies incidence in an endemic area according to the sampling plan:
20-80 % through passive surveillance NRL data
2.3% through active surveillance Wandeler, 1974



6,500 to 25,000 foxes road killed annually in SE (Willebrand, 2024)



50,000 to 80,000 foxes hunted annually in SE (Willebrand, 2024)

Some key points: Ecology of the host

“Red fox (*Vulpes vulpes*) density across Europe varies by more than two orders of magnitude, from <0.1 individuals/km² in northern boreal forests to >8 individuals/km² in parts of southern and central Europe” Barton, 2007, Kopil, 2024

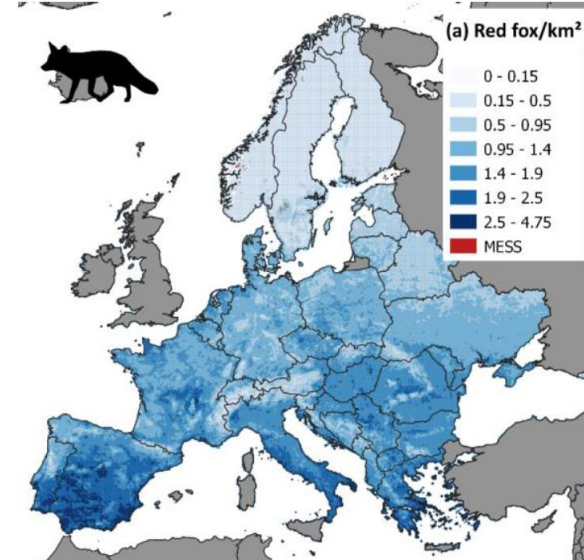
“A pan-European camera-trapping effort across 28 sites in 13 countries found densities typically below 4 foxes/km², with **most sites below 2 foxes/km²**; only two areas (in Italy and Slovenia) exceeded 8 foxes/km²” Guerrasio, 2024

For the sampling within this population,
No sample size required: as much as possible

Historically, till 2013, WHO recommended the examination of at least 8 foxes/100 km² for rabies each year.



EFSA Supporting publication 2023:EN-7894

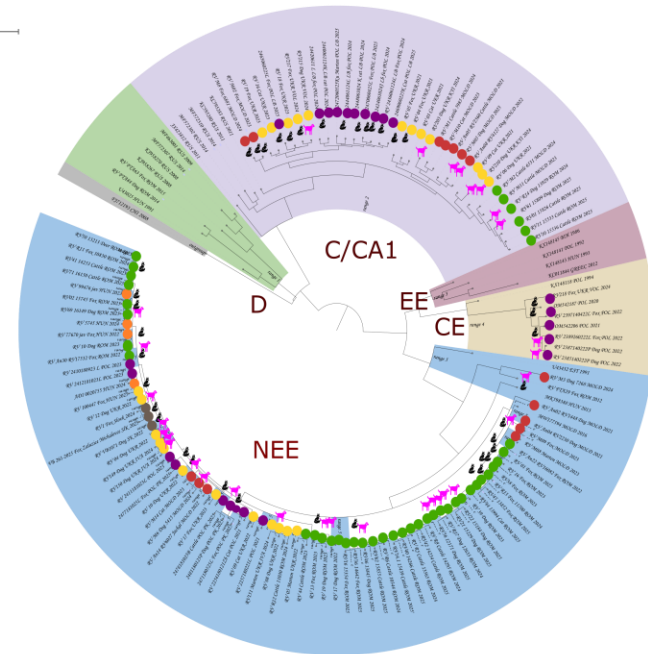
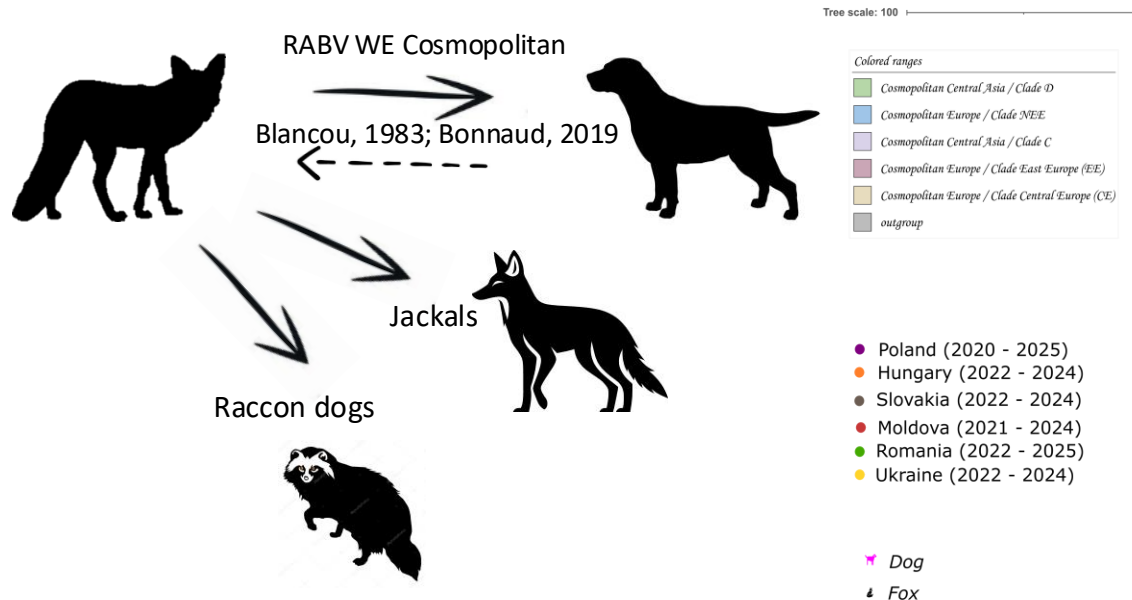


Estimated hunted yield density

Some key points: Epidemiology of rabies in EU

The virus circulating in EU, Ukraine and Moldavia is a sylvatic, fox strain origin

Host-specific viral adaptation induce greater capacity to cause disease in the reservoir species.



Learning from past experience to better anticipate and guide our actions:

What happens without fox vaccination?

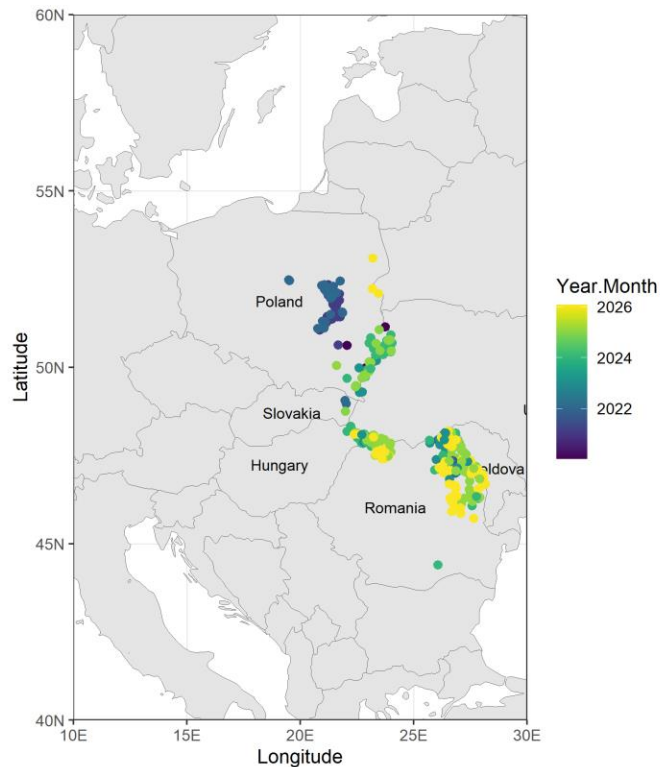
« The European fox-mediated rabies epizootic that began in 1939-1940 soon naive fox population spread westward at 20 to 60 km per year » Lloyd 1976, Aubert 1992,

« Some regional variations were substantial, with the epidemic front retreating in certain areas while advancing up to 100 km in a single year in others » Alanazi 2020

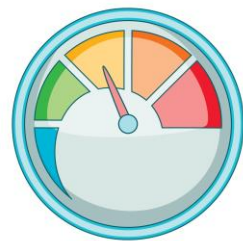
Effort must be deployed out of known infected areas.

« Territorial and social conflicts during the dispersal of juveniles (in fall) and during the mating season (January and February) seems indeed to facilitate the spread of the infection (Aubert 1992). »

« Peaks of infection are indeed typically observed in autumn and in late winter/early spring that coincide with the biological cycle of foxes (Bacon 1985). »



Indicators



✓ Situation of bordering countries

✓ Species detected positives:

The reservoir of the virus species should account for the majority of reported cases.

“Behind every infected livestock, there is likely an undiagnosed fox”

%Positives in UE (ADIS data)	2021	2022	2023	2024	2025	2026
Red fox/Raccoon dogs/Jackals	68	47	32	38	22	22
Pets (Dogs, Cats)	26	35	37	45	41	50
Livestock (Cattle, sheep, goat, horses)	6	18	31	16	37	27

In Europe, 60–80% proportion of positives red foxes were commonly found in endemic areas when the sampling focus on indicator animals

✓ Density (n samples collected and their spatial distribution)

✓ Passive/active sampling:

The majority of cases are expected to be detected through passive surveillance

✓ Sampling pressure out of the infected areas must be ~ affected areas

Conclusion





INVESTIGATE, EVALUATE, PROTECT

THANK YOU!
EXPERIENCE TO SHARE? QUESTIONS?

