ESFLU
European Swine Influenza Network

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ESFLU Management Committee member

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Ploufragan, France

3 - 4 April 2024

December 2020 - OFFLU SIV Technical meeting

Premices of a « SIV EU network »

- 1 private company + 9 public institutes from 8 EU countries
- Main objectives:
  - increase sharing of surveillance data
  - diagnostic tools and flows
  - scientific forum for discussions (incl. vaccination)
- Engage with OFFLU for established linkages?
  - EU regional sub-group?
  - EU contribution to the WHO Vaccine Composition Meetings?
  - Take part to some OFFLU discussions?

→ **ESFLU launched in November 2022**

> To establish an **interdisciplinary European network for swine IAV** to enhance information exchange, raise awareness, and improve pandemic preparedness.

European Swine Influenza Network

ESFLU
European Swine
Influenza Network

cost
EUROPEAN COOPERATION
IN SCIENCE & TECHNOLOGY

Funded by
the European Union

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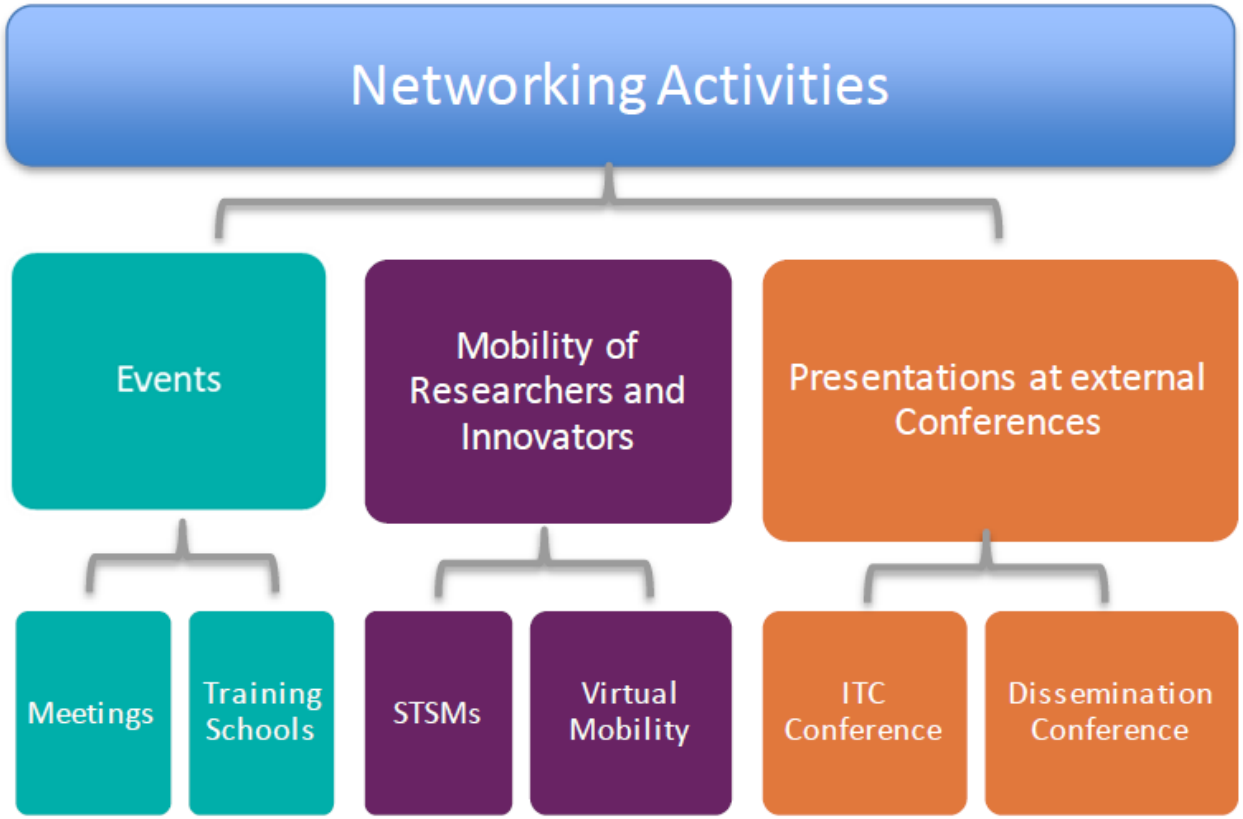
WEB BY

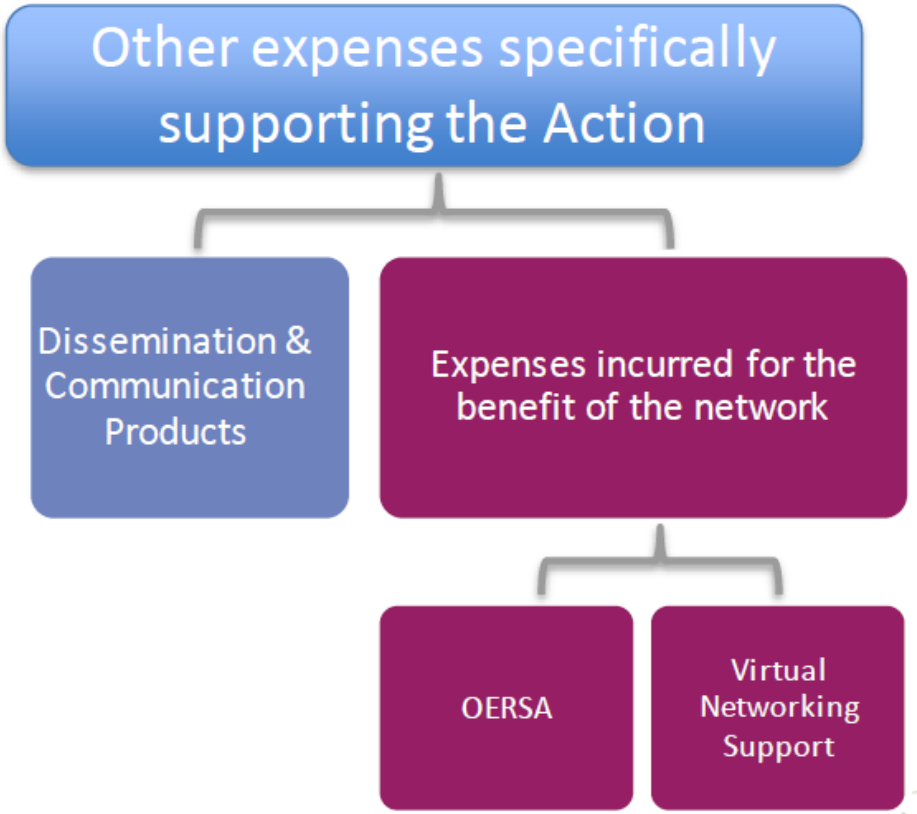
COST (European Cooperation in Science and Technology) is a funding agency for research and innovation networks. Our Actions help connect research initiatives across Europe and enable scientists to grow their ideas by sharing them with their peers. This boosts their research, career and innovation.

CA21132

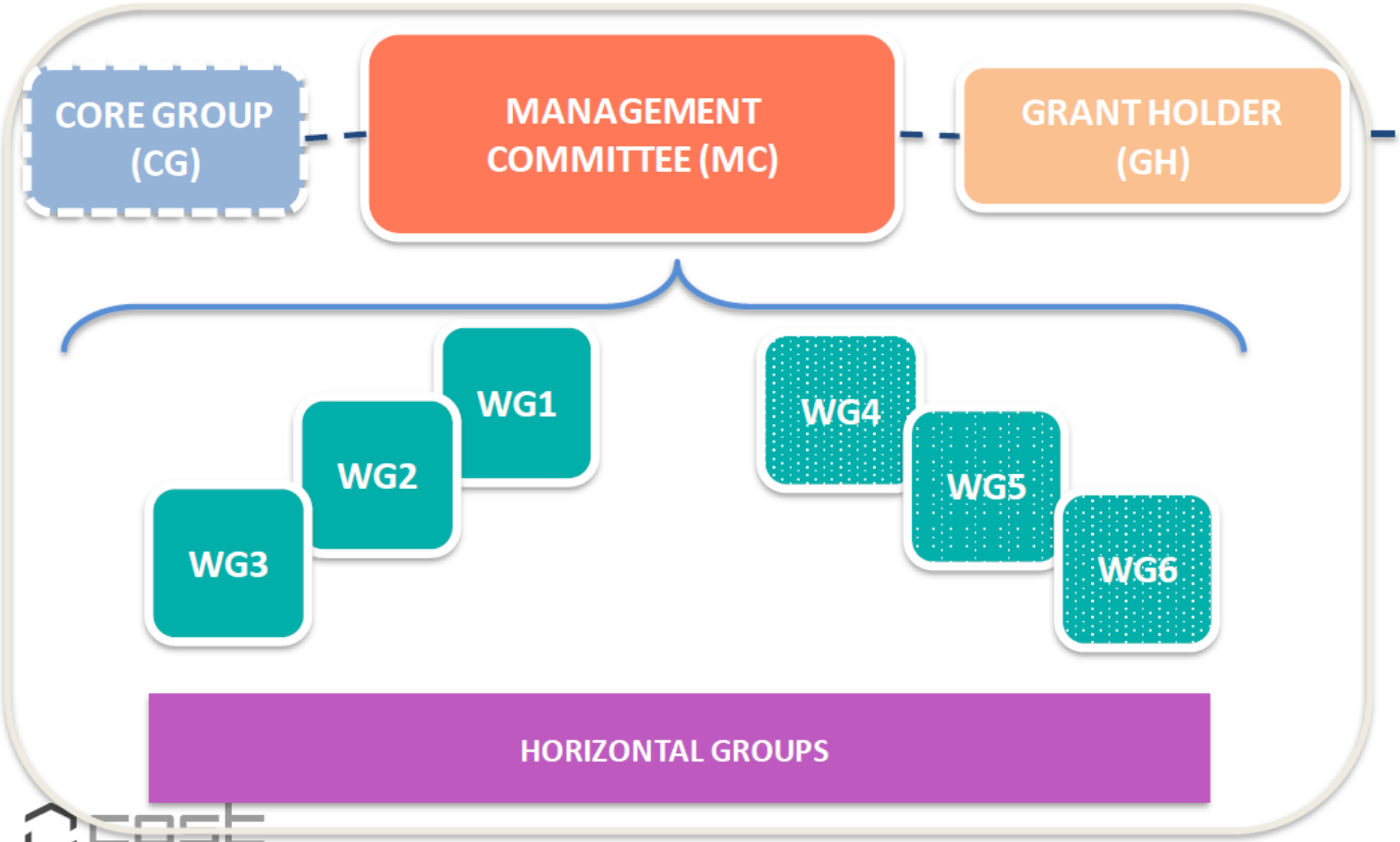
Start Date: 07/11/2022
End Date: 06/11/2026
(4 years)

What can be funded from the COST Action budget?





How are COST Actions organised?



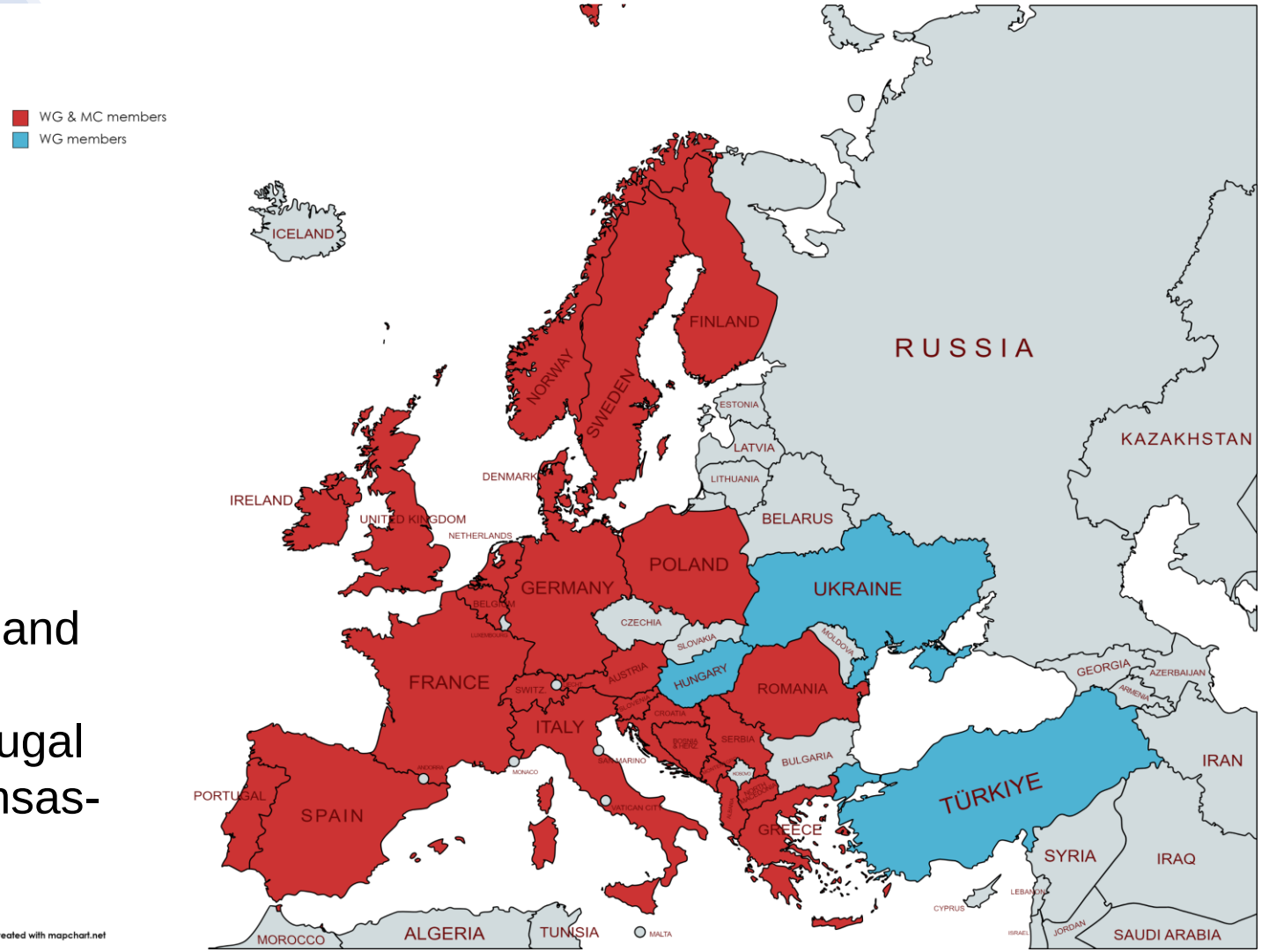
Leadership Positions

- Action Chair
- Vice-Chair
- GH scientific rep.
- WG leaders
- Grant Awarding Coordinator
- Science Comm. Coordinator
- Others as decided by the MC

EUROPEAN COOPERATION IN SCIENCE & TECHNOLOGY

ESFLU geographic coverage

- 30 participating countries (WG)
- 25 countries in the Management Committee (MC)
- 43 MC members
- 159 approved WG members



Chair: Gwénaëlle Dauphin, Ceva, France
Vice-chair: Katarzyna Podgorska, NVRI, Poland

GH Manager: Pedro Bras, Fciensas-ID, Portugal
GH Sc. Representative: Ricardo Dias, Fciensas-ID, Portugal

Working Groups (WG)

- WG 1 - Strengthen the capability in Europe for the identification and characterisation of swine influenza virus
- WG 2 - Increase sharing and analyses of surveillance and virology data
- WG 3 - Foster knowledge exchange on surveillance and management measures to improve control of swIAV in pig herds
- WG 4 - Dissemination, communication and awareness

ESFLU
Main achievements during Grant Period 1

November 2022 – October 2023

Budget: 165 000 €

WG 1

WG 1: Strengthen the capability in Europe for the identification and characterisation of swine influenza virus

- To share and exchange protocols and SOPs in order to strengthen capability for the detection and characterisation of swine influenza A virus circulating in Europe
- To share information on ferret/swine reference antisera panels

Leader: Sasan Fereidouni, UVM Vienna, Austria
Co-leader: Annika Graaf-Rau, HIOH, Germany

Collection of SOPs, protocols, lab information > reviewing and proposal of standardized protocols for countries that are setting-up their surveillance programs

Training School on swIAV Diagnostics

5-8 September 2023

14 trainees - 7 trainers - 7 participating countries

By GD Royal, Netherlands

Short Term Scientific Mission (STSM)

Swine influenza diagnostic and sequencing methods

9-13 October 2023

By WOAH Reference Laboratory for Swine Influenza, IZSLER, Italy

WG 2: Increase sharing and analyses of surveillance and virology data

- To share and analyse contemporary data obtained using the SOPs exchanged in WG1
- To provide pan-European analysis of viral sequence data
- To share and compile surveillance modalities and results
- To share and compile HI data for antigenic cartography

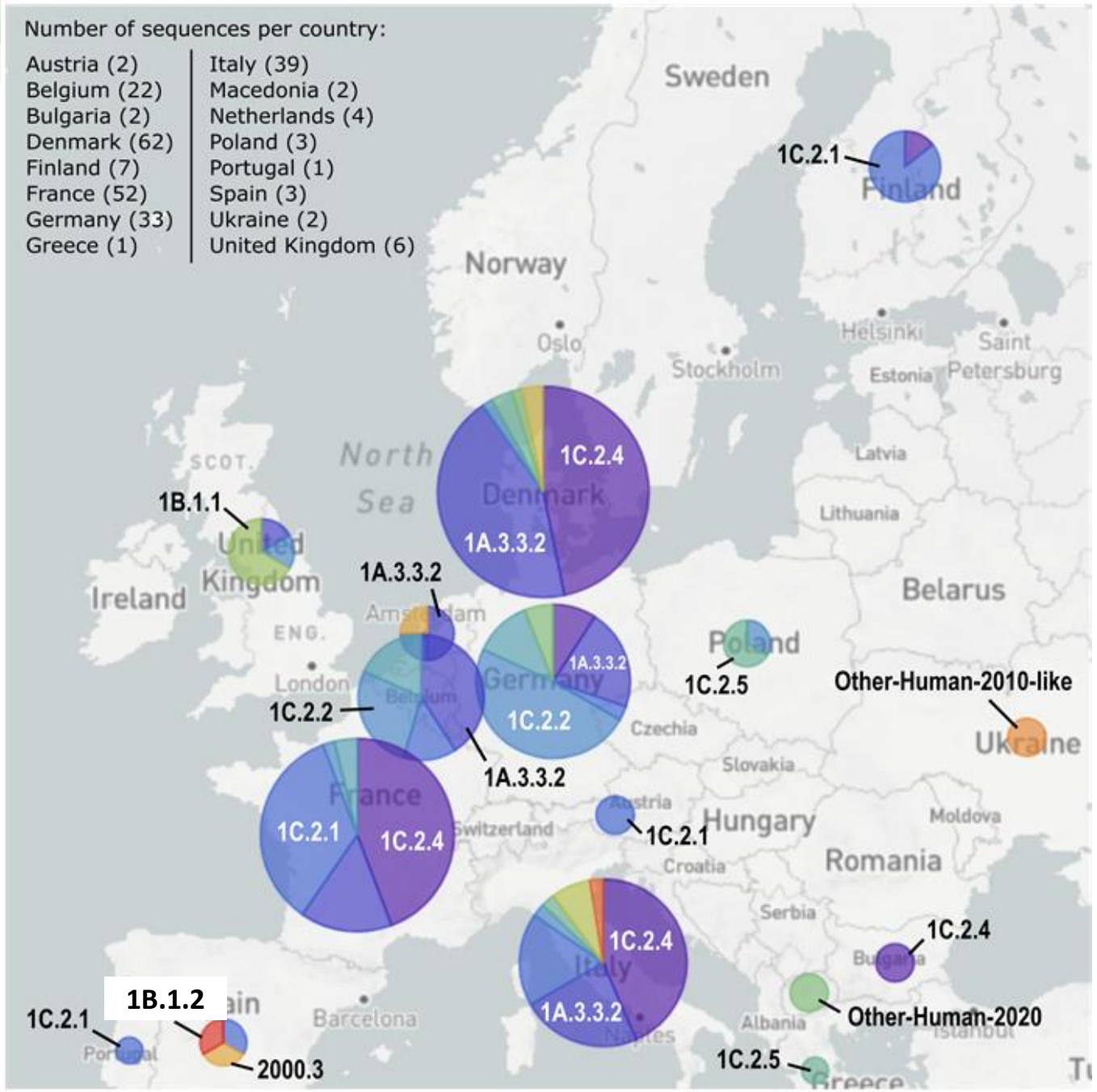
Leader: Gautier Richard, ANSES, France

Co-leaders:

Alex Byrne, Francis Crick Institute, UK

Pia Ryt-Hansen, UCPH, Denmark

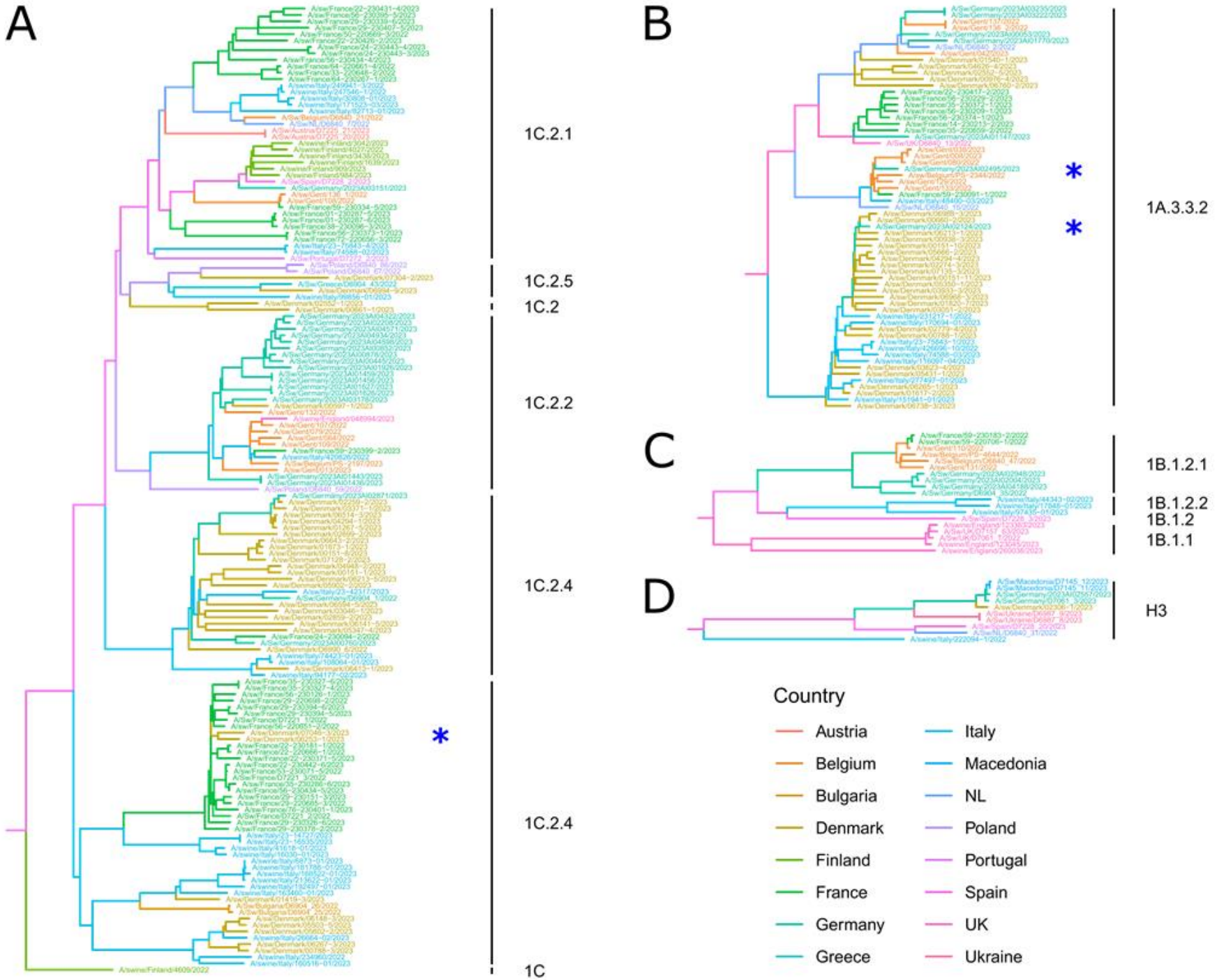
79 Members,
with 24 countries represented



- About **250 strain sequences collected in 16 countries**
- Determination of HA clade using the BV-BRC webserver
- An interactive Nextstrain instance made available
- Some differences of swIAV diversity in each European country
- Predominance of HA 1C (1C.2.4, 1C.2.1, 1C.2.2, 1C.2.5) and HA 1A.3.3.2 clades
- Few HA 1B.1 sequences (1B.1.1 in UK; 1B.1.2, 1B.1.2.1, 1B.1.2.2 – no more 1B.1.2.3 in France)
- Very few H3 sequences (12/255) but 4 lineages (1970.1, 2000.3, 2010, 2020)
- Insights in Eastern Europe countries

HA Clade

1C.2.4 (75)	1B.1.1 (4)
1A.3.3.2 (63)	1B.1.2.2 (3)
1C.2.1 (40)	1C.2 (2)
1C.2.2 (27)	2000.3 (2)
1B.1.2.1 (10)	Other-Human-2010 (2)
1C.2.5 (6)	1970.1 (1)
Other-Human-2020 (5)	1B.1.2 (1)

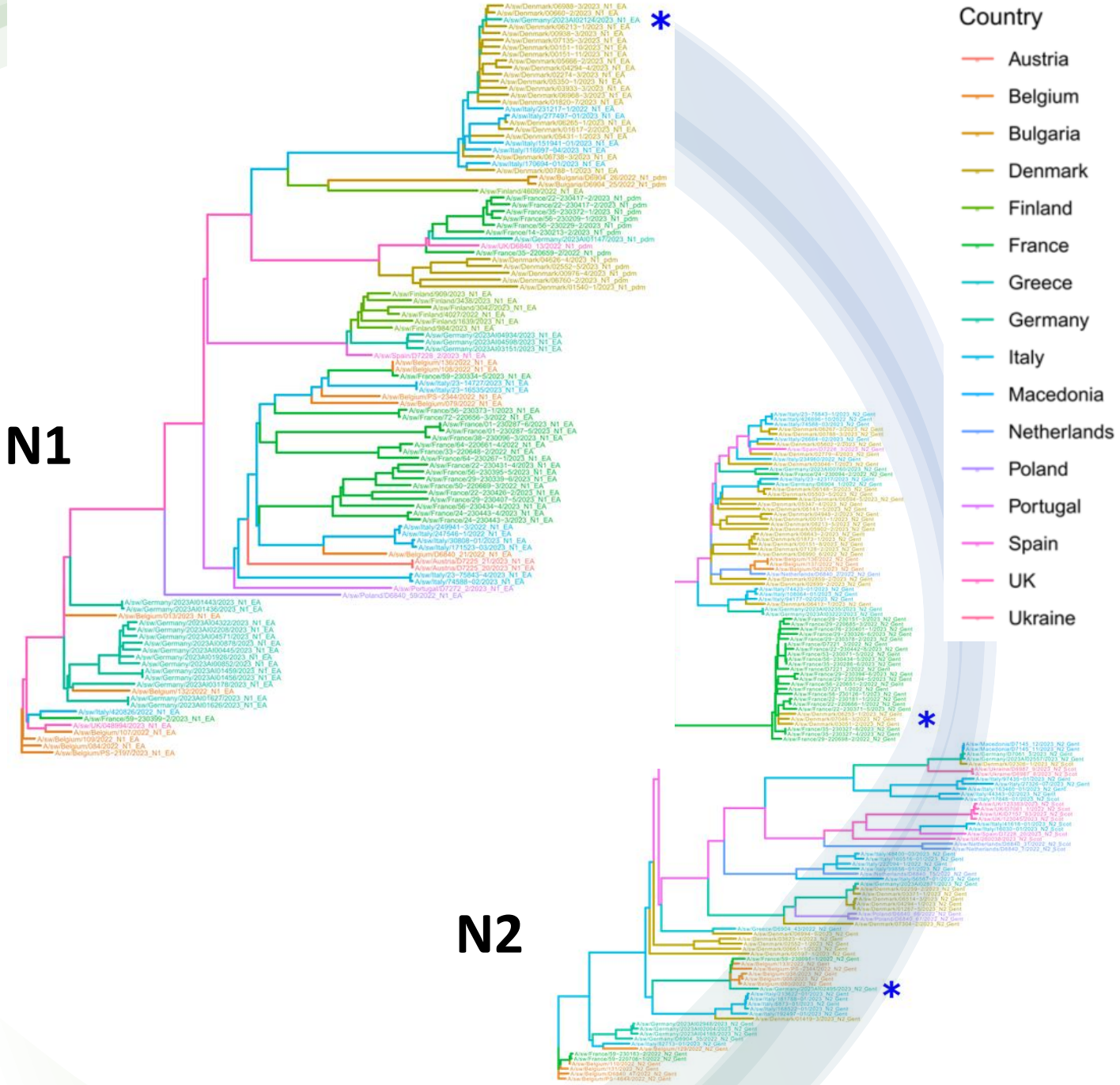


nfluenza virus Technical Meeting

offlu
WOAH FAO
network of expertise on animal influenza

HA Phylogenies

- Most sequences clustered by country
- Some clades specific to certain countries: 1B.1.1 in the UK, 1B.1.2.2 in Italy
- A strange 1C sequence in Finland: part of an old Finnish-specific clade from 2009?
- 1C.2.4 clade separated in 2 sub-clades, one that is mainly from Denmark, and one that is mainly from France, while Italy has both.
- Few H3 sequences, but four lineages.
- blue stars: viruses that could have been transferred between countries.



NA Phylogenies

- Most sequences clustered by countries.
- Potential viruses transfers between countries (blue stars)

First ESFLU report on swIAV diversity and evolution in Europe

https://zenodo.org/records/10598312

Planned intervention: On Thursday March 28th 07:00 UTC Zenodo will be unavailable for up to 5 minutes to perform a database upgrade.

zenodo Search records... Communities My dashboard

Published January 31, 2024 | Version v1

Report Open

European Swine Influenza Network Report on Swine Influenza A Viruses Evolution and Diversity in Europe from October 2022 to September 2023

Richard, Gautier[1]; Byrne, Alexander[2]; European Swine Influenza Network

Show affiliations

Data collectors:

Animal and Plant Health Agency; Ceva Phylaxia; Finnish Food Authority;
French Agency for Food, Environmental and Occupational Health & Safety; Friedrich-Loeffler-Institut; Ghent University;
Istituto Zooprofilattico Sperimentale della Lombardia e dell'Emilia Romagna "Bruno Ubertini";
Istituto Zooprofilattico Sperimentale delle Venezie; Statens Serum Institut; University of Copenhagen

The European Swine Influenza Network (ESFLU) has been established as a COST Action scientific network and its primary objective is to foster scientific collaboration and enhance capacity at the European level for monitoring the evolution and spread of swine influenza A viruses (swIAVs), as well as identifying measures to prevent the spread of swIAVs within and between European countries. This report is the result of collaborative efforts with ESFLU Working Group 2 members sharing swIAV sequences derived from samples collected and sequenced between October 2022 and September 2023, the initial period of the ESFLU COST Action. To achieve this, rigorous phylogenetic analyses were conducted on the compiled sequences of about 250 swIAV strains. These analyses sought to determine the diversity of swIAVs in specific countries and their respective proportions based on the classification and analysis of HA sequences, with additional analyses on their NA sequences. Moreover, the analyses aimed to ascertain whether certain viruses had potentially traversed national boundaries, indicating the cross-border movement of these viruses.

Sharing of the collected ESFLU sequences to OFFLU

After diversity reduction

December 2023 > VCM Feb 2024

NGS Pipelines Ring Trial

Comparing bioinformatics pipelines of European teams to assess comparability of the consensus sequences produced between teams when using the same sequencing dataset

- 12 sequencing files of good/sufficient/bad quality (missing segments) collected from 4 partners
- 9 labs analysed the 12 samples with their own bioinformatics pipeline
- Sequences were then aligned and percent identity matrices comparing the pipelines were computed per sequence
- Sequences comparisons between pipelines usually showed very similar results for most pipelines

Phylodynamics STSM

By IZSVe, Italy

AliView

MAFFT

BEAST

Bayesian Evolutionary Analysis Sampling Trees

IQ-Tree

TreeTime

EvoLaps

Training the WG2 leader and co-leader in performing phylodynamics studies on swIAV datasets

✓ To ensure they have the skills to properly analyse the sequences collected during the ESFLU COST Action,

✓ To train subsequent ESFLU members how to perform phylodynamic analyses on their own data.

1 week of training in October 2023, on two real-world swine influenza datasets.

WG 3: Foster knowledge exchange on surveillance and management measures to improve control of swIAV in pig herds

- To review and discuss current surveillance schemes and diagnostic sampling frames.
- To conduct a cost benefit analysis of improved surveillance and a risk assessment of emerging influenza variants
- To suggest optimized sampling frames for surveillance and exchange tools for analysis of data from field trials
- To establish a platform for sharing of evidence-based data on SwIAV with policy- makers, public institutions and authorities

Leader: Lars E. Larsen, UCPH, Denmark
Co-leaders:
Marie Sjolund, SVA, Sweden
Sophie Gumbert, LMU, Germany

- ✓ Review on current surveillance schemes (questionnaires)
- ✓ Review on efficacy (= reduction of transmission) of swIAV vaccines
- ✓ Cost-benefit analysis of improved surveillance
- ✓ Risk assessment of emerging swIAV variants
- ✓ Establishing guidelines for optimized management and control of swIAV in pig herds
- ✓ Evaluation of the impact of ASF prevention measures on swine influenza in Europe (Anthropologists)

WG 4: Dissemination, communication and awareness

- To communicate information to stakeholders, policymakers and the general public
- To raise awareness on swine influenza and its risk for public health
- To contribute to a One Health approach to swine flu

Leader: Dinko Novosel, HVI, Croatia
Co-leader: Tij Tobias, Utrecht Univ., Netherlands

Scientific annual meeting

Scientific communications in international conferences

Linkages with OFFLU

Agreement on 27th October 2023 > Participation in OFFLU SIV meetings as the European branch

Sharing of the collected ESFLU sequences to OFFLU after diversity reduction: first sequences sent in Dec 2023 for VCM Feb 2024 (WG2)

Next sequence collection will be from the April 29th to May 13th and will concern sequences collected from November 2023 to April 2024 > compilation and selection ready for sharing with OFFLU in July 2024 > VCM September 2024

Acknowledgements

All ESFLU leaders & members

especially those who shared swIAV sequences for first ESFLU WG2 report and contribution to OFFLU-VCM calling in December 2023

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Cubas Gaona L.	Ceva Phylaxia, Hungary
Kantala T.; Kauppinen A.	Finnish Food Authority (FFA), Finland
Richard G.; Hervé S.; Quéguiner S.; Blanchard Y.; Simon G.	French Agency for Food, Environmental and Occupational Health & Safety (ANSES), France
Chiapponi C.	Istituto Zooprofilattico Sperimentale della Lombardia e dell'Emilia Romagna (IZSLER), Italy
Cavicchio L.; Pastori A.; Mion M.; Salviato A.; Schivo A.; Palumbo E. ; Giussani E.; Fusaro A.; Ceglie L.	Istituto Zooprofilattico Sperimentale delle Venezie (IZSVe), Italy
Mollet B.; Everett H.; Byrne A.	Animal and Plant Health Agency (APHA), United Kingdom

Thank you