Progress on risk mapping for targeting surveillance and control

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1st February 2019
Risk mapping of animal diseases

Mapping has become increasingly important in assessing the spatial distribution of animal disease risk. The visual nature of maps is especially helpful in identifying the spatial heterogeneity of disease risk. Risk maps are powerful tools for assisting animal health policy makers in disease management, through a better allocation of limited resources.

Practical outcome: Identify high-risk areas where active surveillance (risk-based sampling strategy, clinical investigations cf. Thrace) and control measures would be targeted. Risk mapping supports infectious diseases’ early detection and reaction systems.
EuFMD Partnership: Support to CIRAD to improve capacity of veterinary services on risk mapping in Africa in 2018-2019

Activities
Develop a **FMD surveillance program on risk information and mapping tools** for southern European neighbourhood, integrating movement patterns of domestic livestock,
Train **Veterinary Services of 6 countries (Algeria, Chad, Mauritania, Morocco, Senegal and Tunisia)** on qualitative risk analysis, geographic information systems and network analysis;
Conduct specific **field surveys** to adress the knowledge gaps on national and transboundary animal mobility

Targets
Update and optimize surveillance protocols for TADs with a risk-based approach and in particular,
Design a surveillance for FMD early detection in high-risk areas in the Maghreb

Agenda:
« Risk mapping for the control of FMD » webinar (May 2017)
«Qualitative risk mapping & Optimization of national monitoring systems: development of risk-based surveillance protocols for FMD and other TADs » (France, 23-27 April 2018)
« Journées REMESA » Sharing at the Maghreb level the risk assessment, risk maps and risk-related activities implemented at national level (France, 27-28 November 2018)
One day technical meeting EuFMD CIRAD (Italy, 22 January 2019)
«Qualitative risk mapping & Optimization of national monitoring systems: development of risk-based surveillance protocols for FMD and other TADs » (France, 1-12 April 2019)
CIRAD qualitative risk mapping methodology at the country-level

- Risk information
  - Livestock mobility
  - Environmental features
  - Human and animal population densities
  - Outcomes of surveillance and control activities

Data management

Network analysis

GIS integration

Weights to risk factors

Risk maps
Verification of risk maps (1/2)

Sensitivity to 2018/2019 FMD epizootics, a good level of confidence for policy makers

Algeria: ~70% of reported FMD outbreaks in 2018 match with high and very high risk areas

Tunisia: 75% of reported FMD outbreaks match with high and very high risk areas
Verification of risk maps (2/2)

Sensitivity to 2018/2019 FMD epizootics, a good level of confidence for policy makers

Morocco: Localities at the centre of Morocco heavily impacted by FMD outbreaks (Aug 18- now) were identified as major contributors to disease spread.
A regional approach for FMD Risk Mapping

Mapping of the live animal trade network at the regional level shows
- **strong regional connexion between markets** and
- **intense live animal trade within the network**
Markets and grazing areas are **contact points** and **disease hotspots** for geographically distant herds

**Main livestock trade axes at the regional level**

- Berkane Taourirt (**Morocco**) - Nador (**Algeria**)
- Aen Defla (**Algeria**) - Kayes (**Mali**)
- Niono (**Mali**) - Bassikounou (**Mauritania**)
- Kiffa (**Mauritania**) - Dakar (**Senegal**)
- Barkéol (**Mauritania**) - Bula (**Guinea Bissau**)
Regional initiatives for the European neighbourhood in 2019

EuFMD Pillar II: *Reduced FMD risk to Members from European neighbourhood*

supports the *regional establishment of disease risk information and mapping systems*,
for the benefit of both European member states and European neighbourhood

**Autumn 2018 FMD Vaccination campaign for cattle**

An online platform for immediate sharing of disease information (outbreak notifications and vaccination campaigns) is already in place in the Transcaucasus countries and Turkey

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Future direction for the approach: multi-risk information

The **same methodology** can be applied to **further integrate risk information** on:
- Animal mobility (pastoral and commercial movements)
- Results of surveillance activities,
- Reports of vaccination campaigns,
- Market prices and other economic indicators that would proxy animal movements (price differentials across borders, price fluctuations)
- Climatic indicators

Towards the assessment of the **temporal distribution** of disease risk: Seasonal risk maps for countries and regions integrating peaks of animal mobility and live animal trade (Routine versus Festivital period)

To gather risk information, **EuFMD will support:**
- The establishment of a network of intelligence national/pool focal points
- Further training of Veterinary Services
- New developments of the tool (online dynamic platform, web-sourced data)
Future direction for the approach: FMD and similar diseases

This methodology is applicable to other TADs sharing similarities (drivers) with FMD

To further spread the risk mapping methodology, EuFMD supports CIRAD to produce a Guidebook for Veterinary Services, in English and French: expected release by April 2019
Challenges in risk mapping

Recent FMD outbreaks in North Africa further support the need for **collection of risk information at the regional level**, the need of a **regional approach for disease surveillance and control**, and **ownership** of such initiatives.

Model: signature of a *Statement of Intentions* in Transcaucasia

Risk mapping provides static pictures of a dynamic disease ecosystem, risk maps must be **updated on a regular basis** and validated by national CVOs, for surveillance to be re-adpated.

**From description to prediction**: towards computational models to predict disease occurrence and find drivers of disease spread.
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Thank you for your attention

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