



To foresee for preventing: tools in epidemic emergencies management

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Foresee for preventing

- **Resources** are limited
- The maximum level of efficiency should be achieved in their use
- It is not possible to be **ALWAYS** ready for **ANY** event **EVERYWHERE**



Foresee for preventing

The **risk assessment** and other provisional methods permit:

- To estimate the probability of **introduction and spread of infectious diseases**
- To identify the **herds/flocks** more at risk for the spread of infectious diseases



To estimate the probability of introduction and spread of infectious diseases



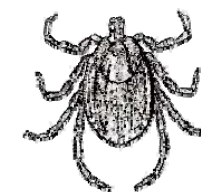
Risk Maps

- For example: let's consider two (re)emergent diseases:

- African Horse Sickness (AHS)

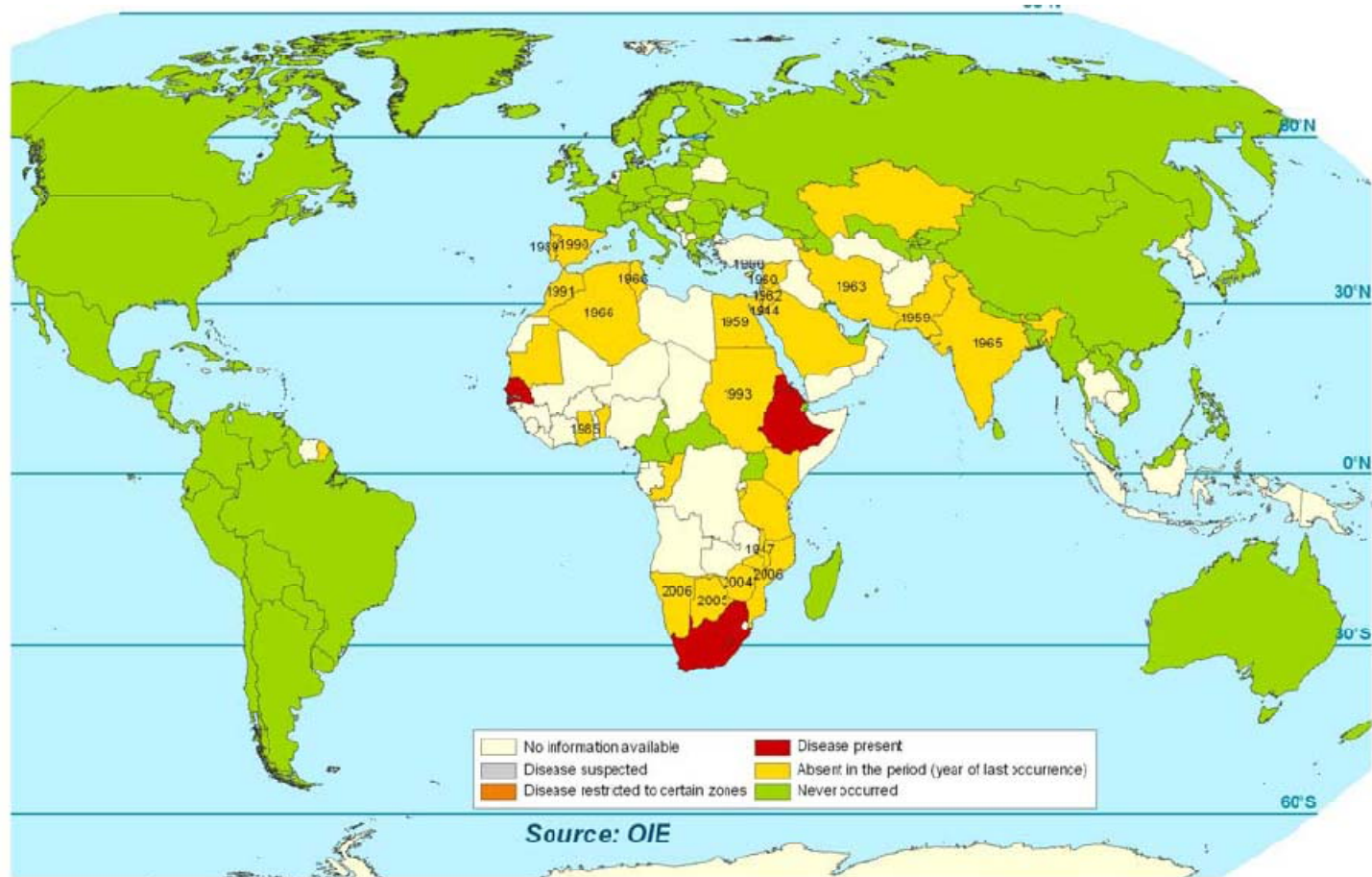


- Crimean-Congo Haemorrhagic Fever (CCHF)



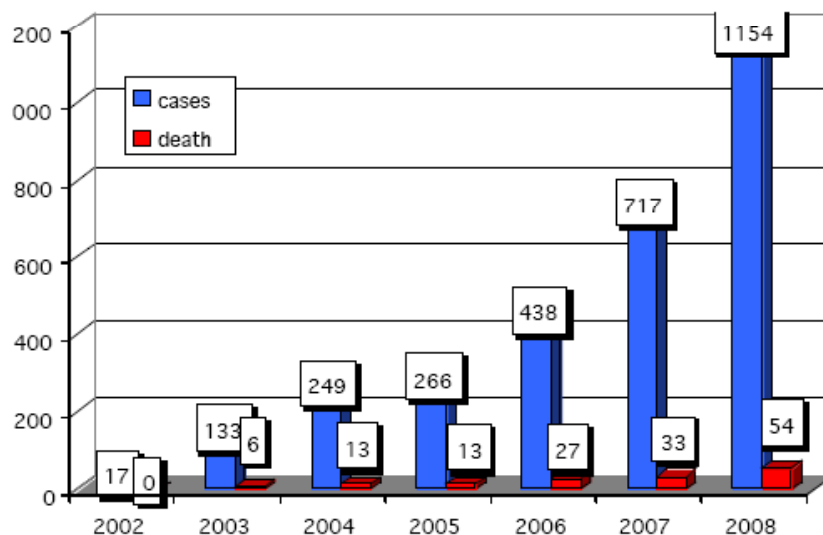


AHS geographic distribution



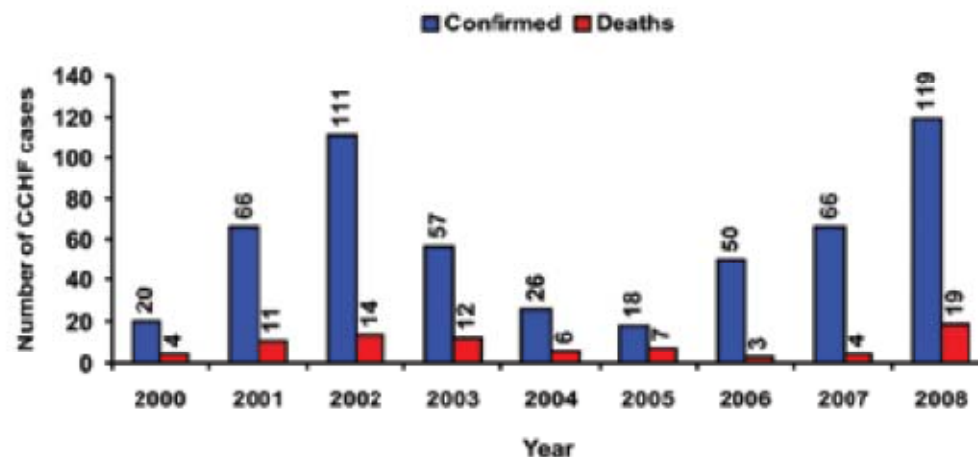


Crimean-Congo Haemorrhagic fever



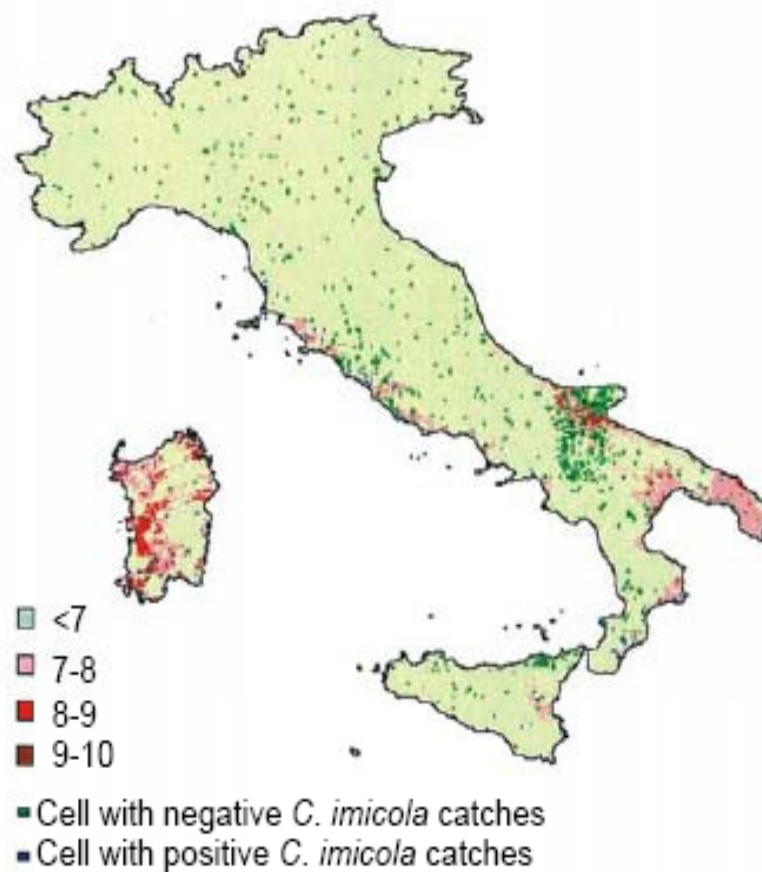
Turkey

Iran



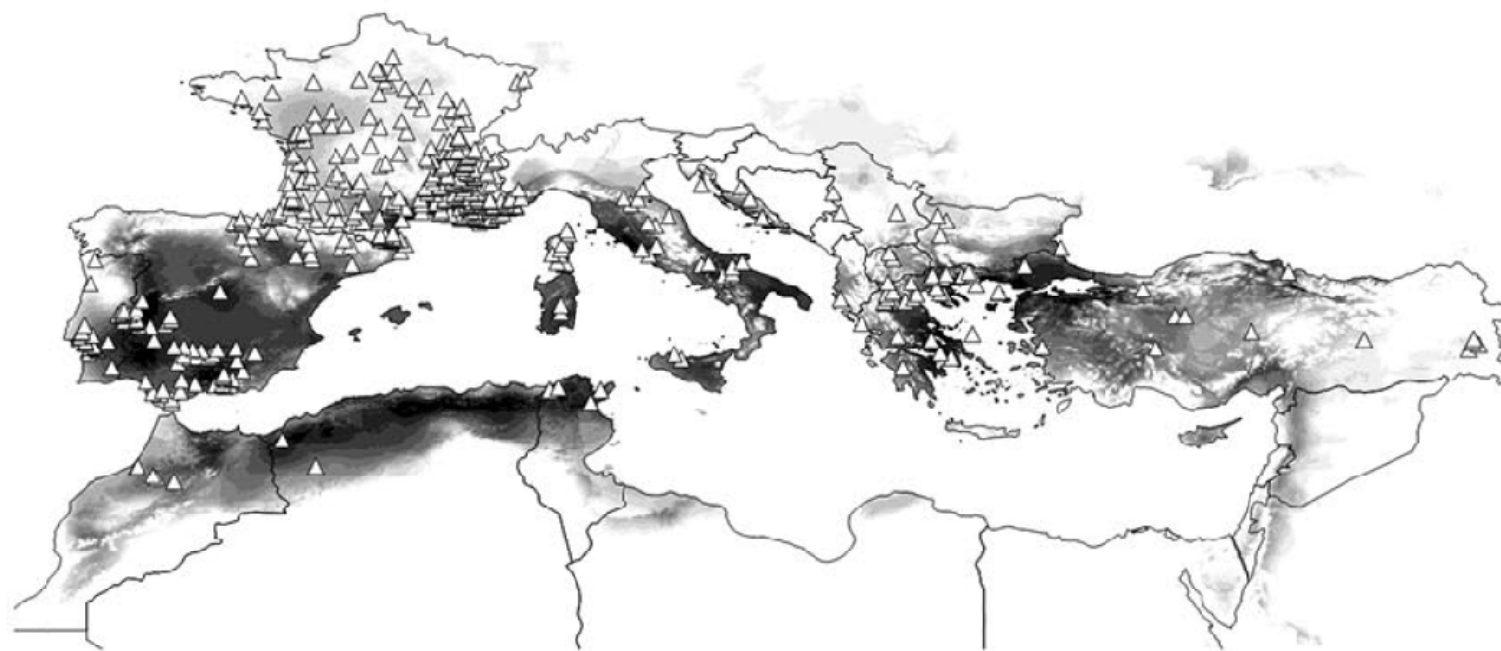


Risk Map for *C. imicola* in Italy





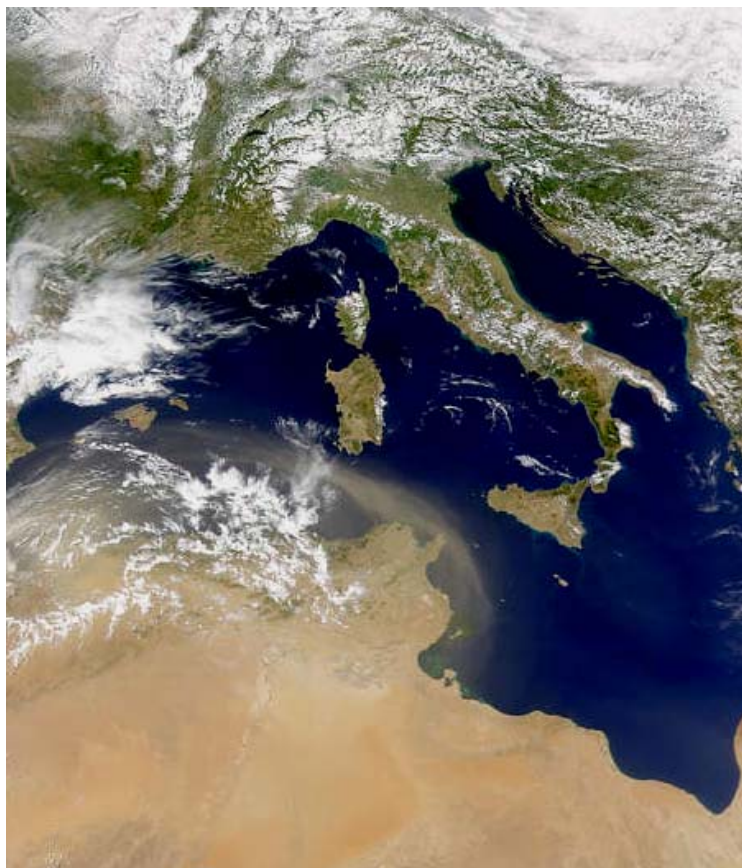
Risk Map for *Hyalomma marginatum*

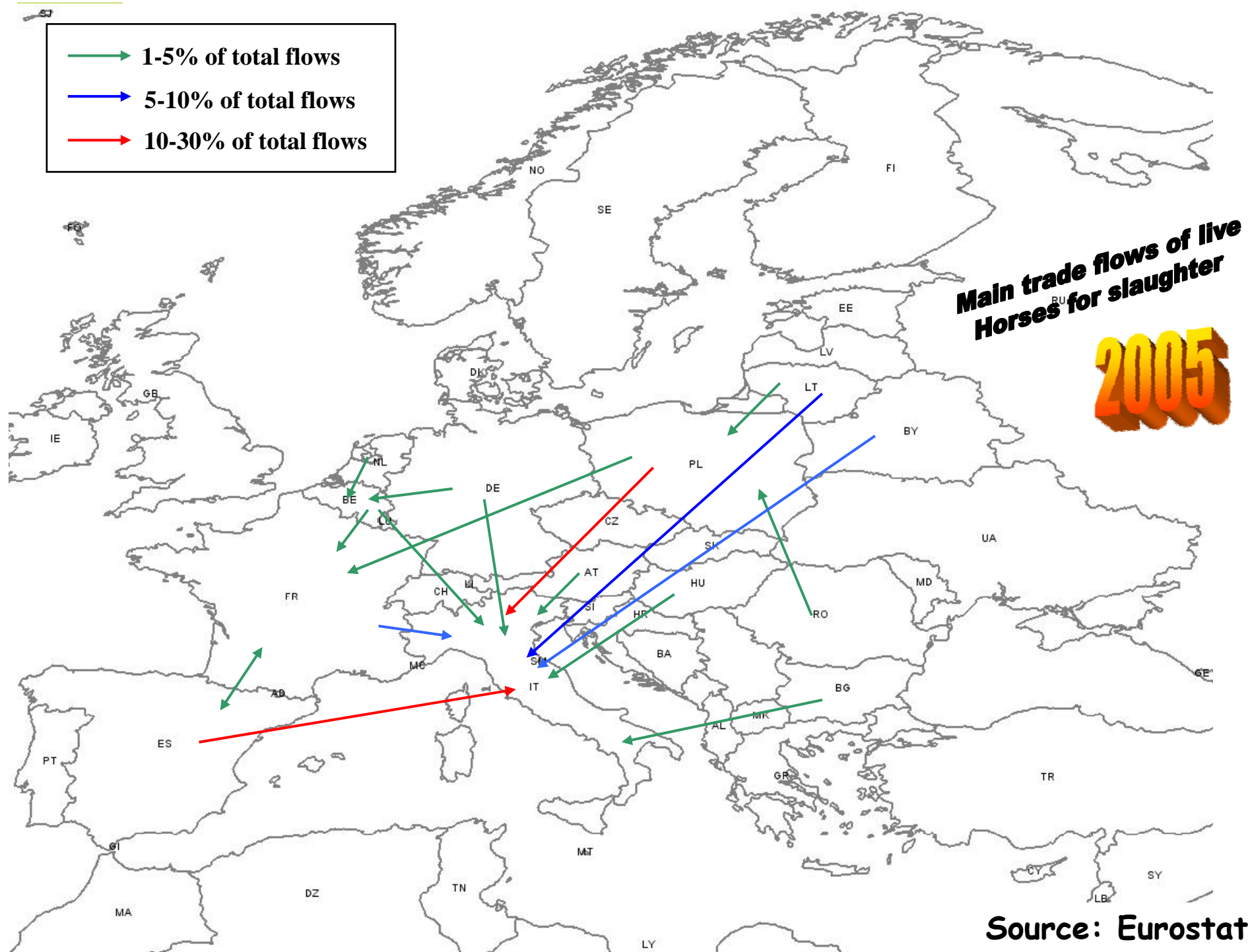


Estrada-Peña A. and VENZAL J.M. Climate Niches of Tick Species in the Mediterranean Region: Modeling of Occurrence Data, Distributional Constraints, and Impact of Climate Change. J. Med. Entomol. 44(6): 1130-1138 (2007)



Mediterranean Basin: one unique epi-system?







Utility of risk maps

- To better target **early warning systems**
- To better program the production and store of **vaccines** and **diagnostic material**
- To better focus the **repartition and dislocation of resources**

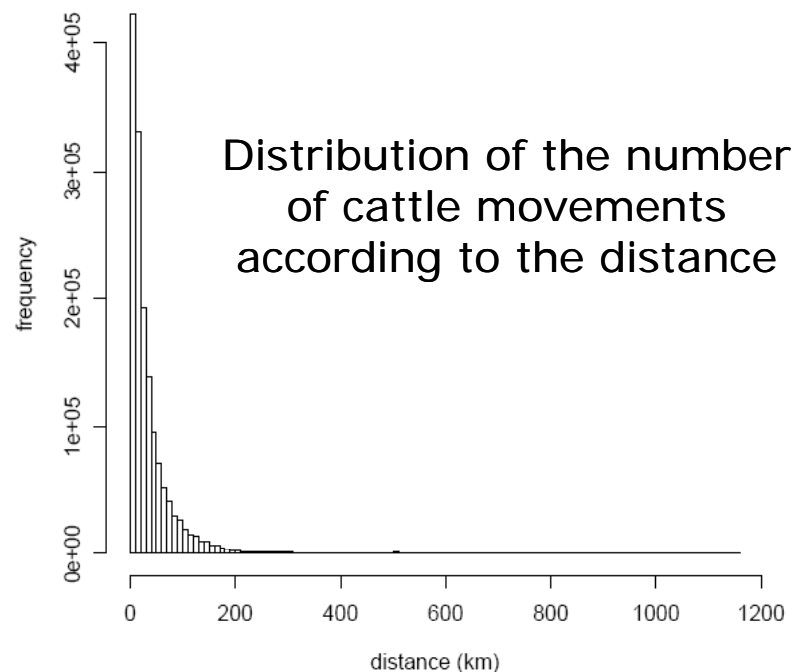


To identify the herds/flocks more
at risk for the spread of infectious
diseases



Italian cattle network

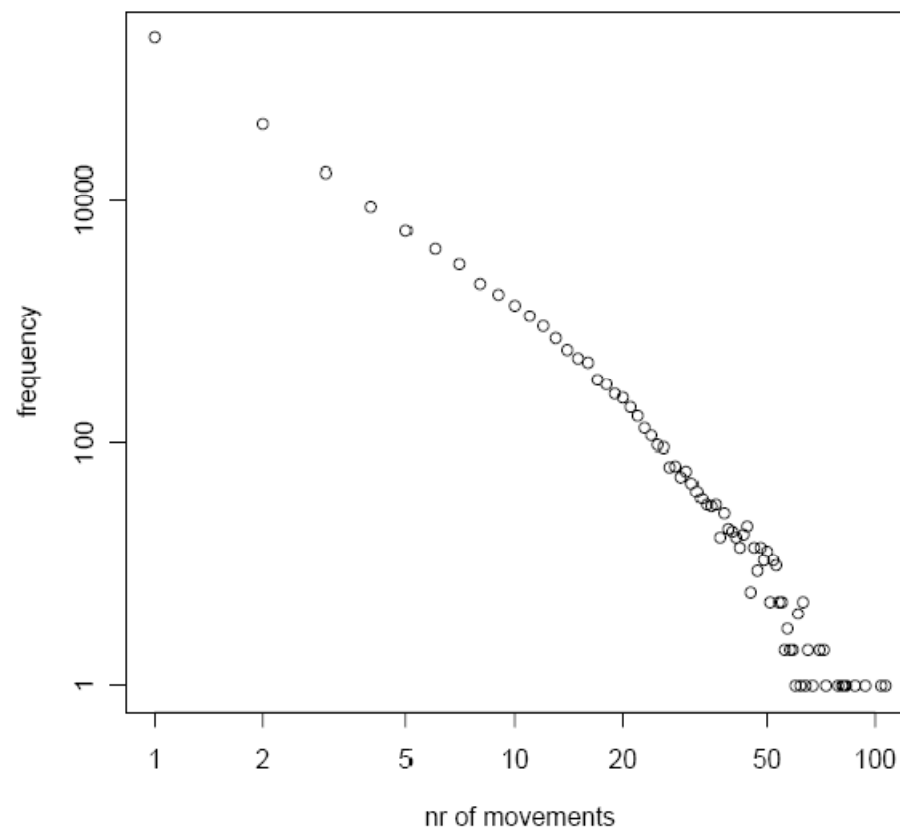
- **Social Network Analysis (SNA)**
techniques permit to analyze the links between herds given by the movement of animals





Italian cattle network

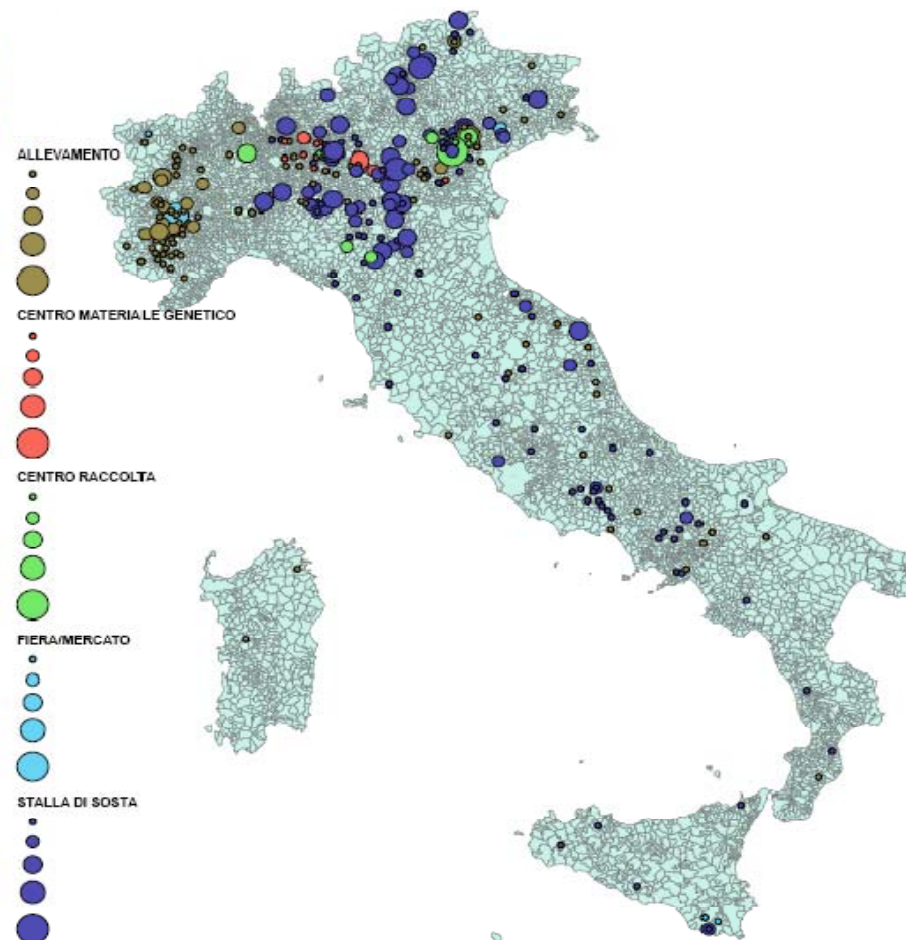
Distribution of the
annual number of
movements started
from each herd





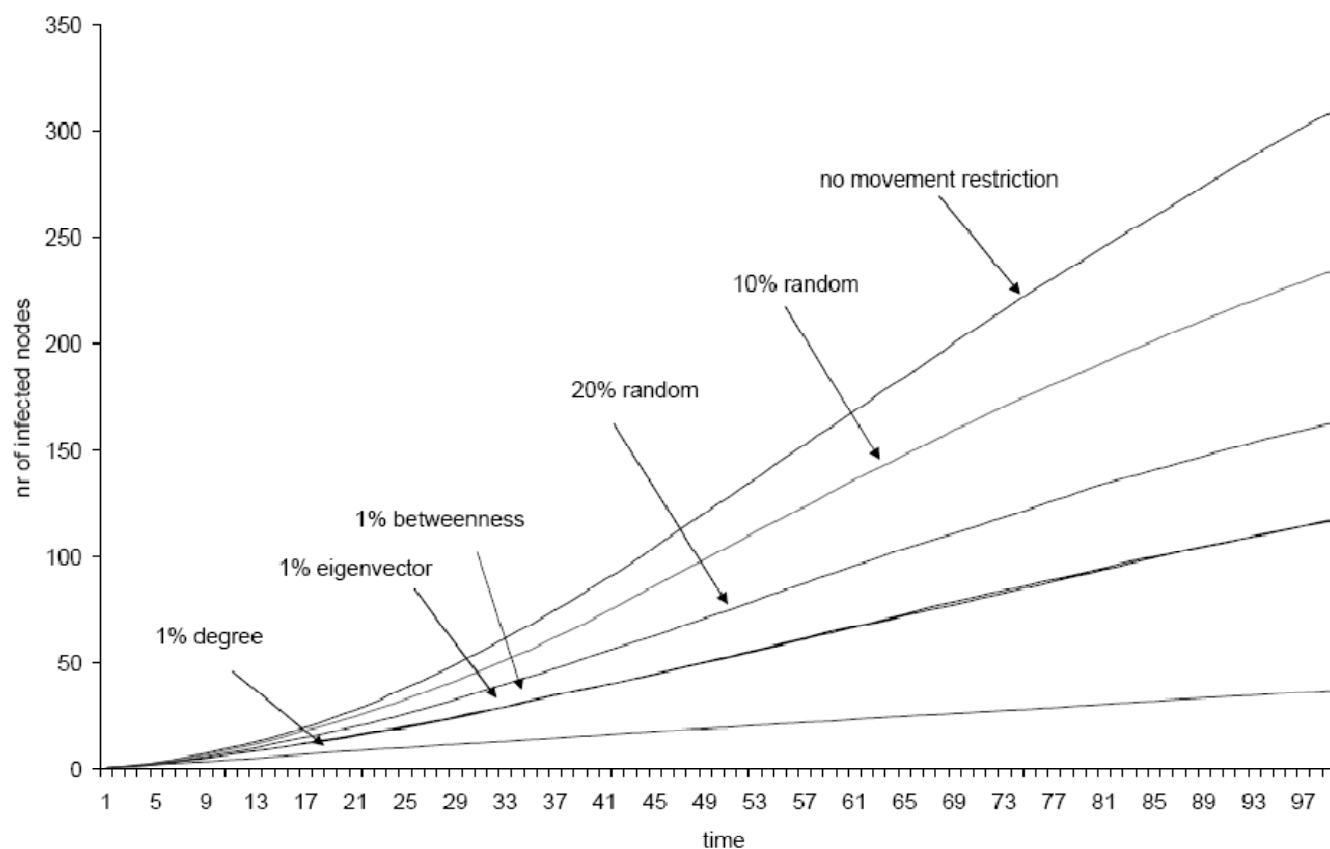
Premises at risk

Geographic distribution
of herds with highest
values of "degree"
(connections,
movements) according
to the type of premise





Efficacy of interventions





Tools for the management of epidemic emergencies



Tools for the management of epidemic emergencies

ACTION should follow **DECISION** as soon as possible:

- **Command chain** should be short
- **Procedures** tested during simulations
- **Resources** availability (financial, equipments, personnel)



Procedures



PIANO DI CONTROLLO REGIONALE PLURIENNALE INTEGRATO

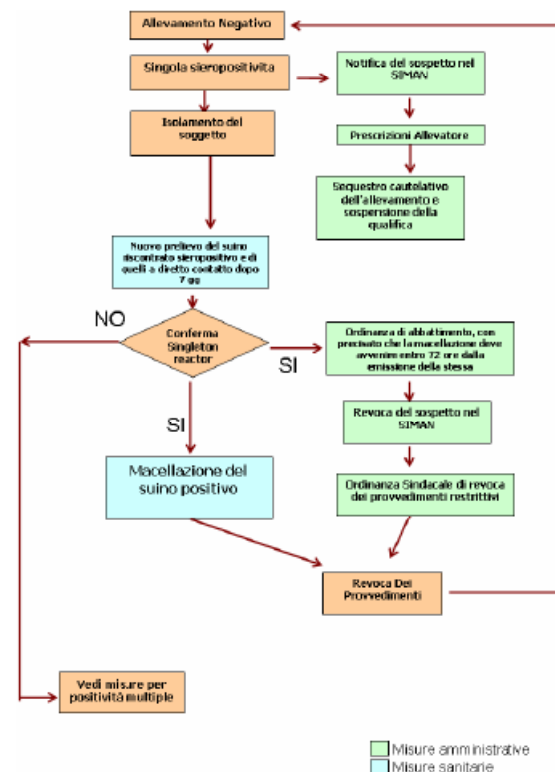
PROTOCOLLI E PROCEDURE PER LE ATTIVITA' PIANIFICATE
IN SANITA' ANIMALE

MALATTIA VESCICOLARE SUINA



NORMATIVA DI RIFERIMENTO

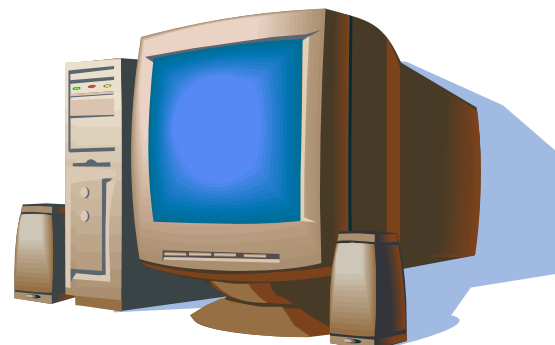
- Ordinanza Ministeriale 12 aprile 2008: Misure sanitarie di eradicazione della malattia vescicolare del suino e di sorveglianza della peste suina classica.
- Ordinanza Ministeriale 12 aprile 2008: circolare esplicativa (Prot: 14121 - 30/06/2008 DGSA/P).
- Ordinanza Ministeriale 12 aprile 2008: chiarimenti ed indicazioni operative (Prot: 0016479 - 07/08/2008 DGSA/P).
- Ordinanza Ministeriale 12 aprile 2008: ulteriori chiarimenti. (Prot: DGSAFV III / 19965/P - 08/10/2008)






To know for choosing

- Decision-makers and in-field personnel must have access to **updated and reliable information**





WEB GIS

 *Ministero della Salute*

Map showing the distribution of diseases in Italy. The map includes a legend, search filters, and a list of results.

Ricerca

Focolai:

Cerca per: ☒ Stato focolaio ☐ Specie

Malattia: **'bluetongue', 'West Nile F'**

Da: **26/11/20** a: **31/12/20**

Stato focolaio: **'C', 'S', 'E'**

Strutture:

Tipo: **'ALL'**

Allevamenti:

Specie: **'BOVINI E BUFALINI'**


Ricerca con buffer





Legenda

Informazioni

Area di notifica

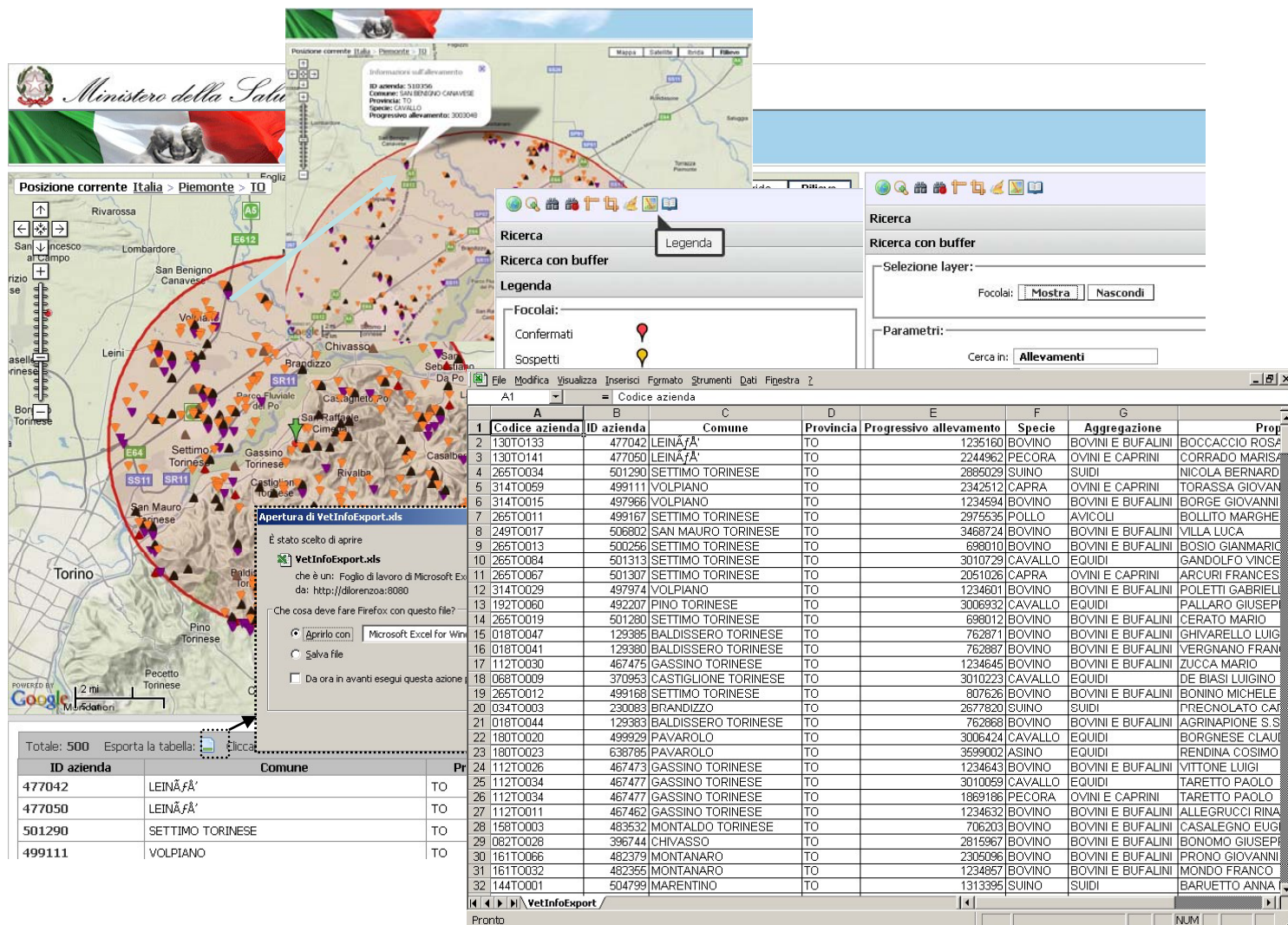
65 focolai trovati

Totale: 65 Esporta la tabella:  Cliccare sull'intestazione delle colonne per ordinarle per contenuto

ID azienda	Comune	Provincia	Malattia	Stato del focolaio	Tipo focolaio	Data sospetto	Data conferma	Data estensione	Vai
480173	PIASCO	CN	Bluetongue	E	P	Wed Dec 17 01:00:00 CET 2008	19/01/09	20/03/09	
152879	BARBANIA	TO	Bluetongue	C	P	Fri Oct 09 02:00:00 CEST 2009	06/11/09		
477356	LEMIE	TO	Bluetongue	C	P	Wed Aug 12 02:00:00 CEST 2009	17/09/09		
504486	SAN RAFFAELE CIMENA	TO	Bluetongue	C	P	Fri Sep 25 02:00:00 CEST 2009	26/10/09		



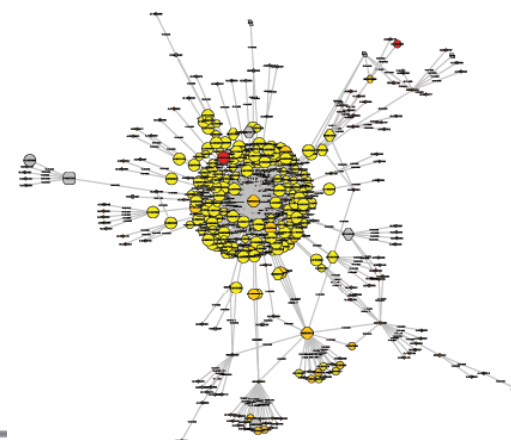
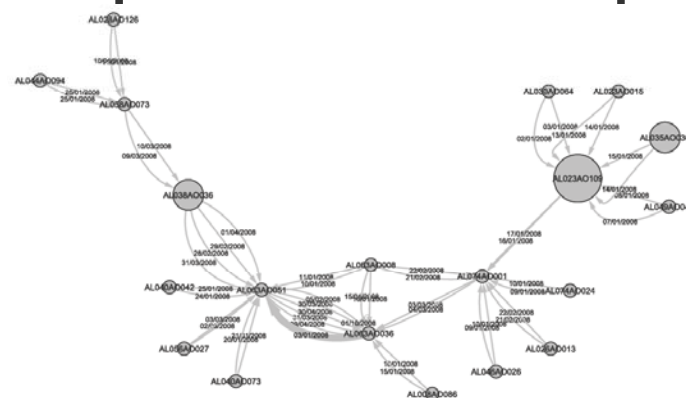
WEB GIS





Tools for epidemiological investigations

- **Epitrace:**
to quickly visualize all connections directly and indirectly linked to a specified herd/flock (outbreak) during a specified time period





EpiTrace

EpiTrace Tracing livestock for controlling epidemics

Home Run Manual Acknowledgements Contacts

Search: 152147 Grid Layout

Control Panel

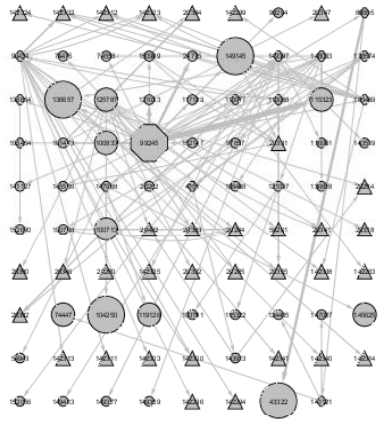
Download Network Simulation

Data Source: Test
User Name: test
Password: ●●●●

Function: TraceF
Node: 152147
Date: 01/01/2009
Depth: 10

Ok

TF [152147] [01012009] [10]



Nodes Edges

ID	Address	Town	Type	Latitude	Longitude	Population	Infected	Risk	Risk W	Vulner.	Vulner. W
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Epitrace

EpiTrace Tracing livestock for controlling epidemics

Home Run Manual Acknowledgements Contacts

Search: 152147 Hierarchical Layout

Control Panel

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TF [152147] [01012009] [10]

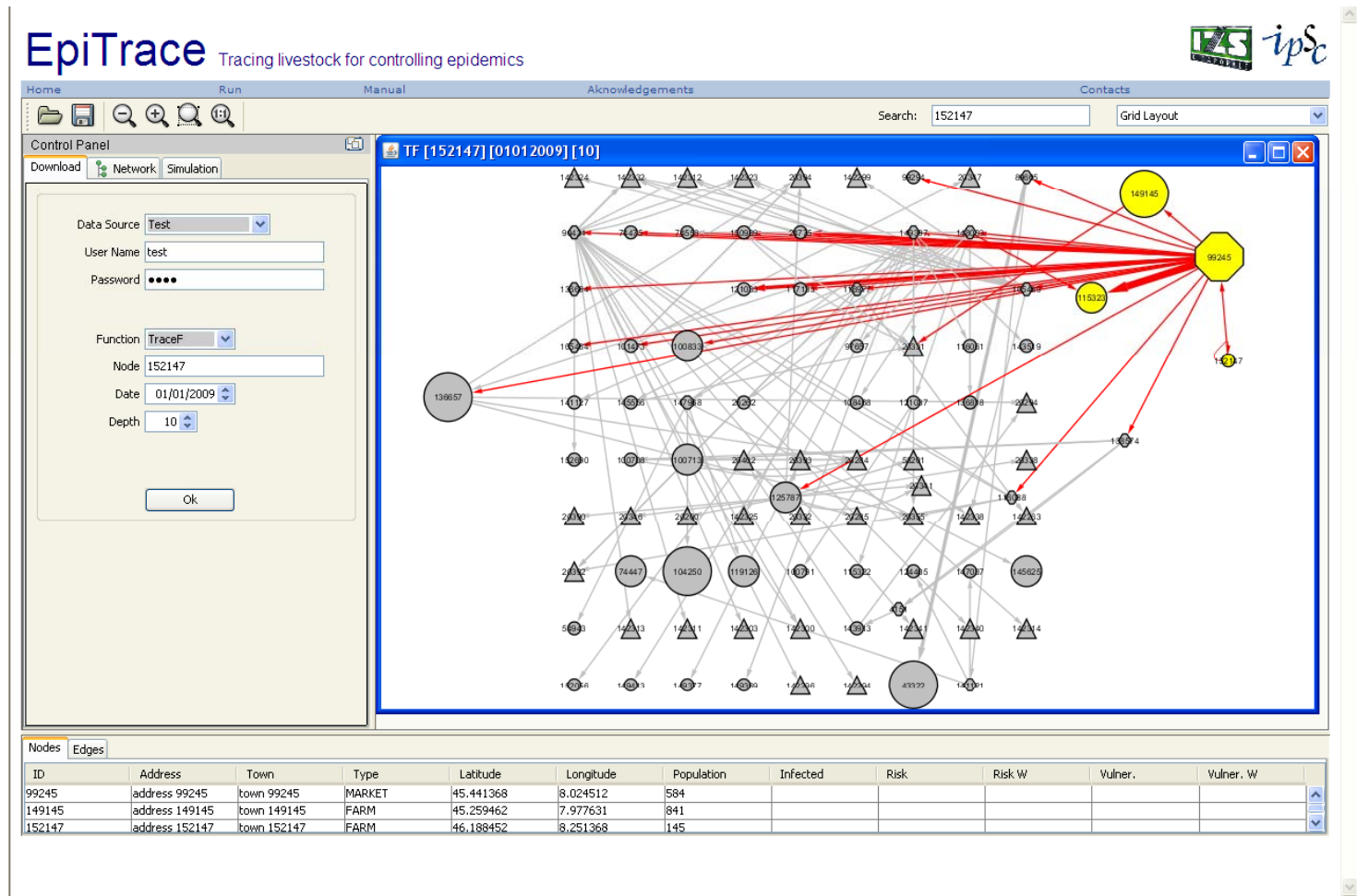
Nodes Edges

ID	Address	Town	Type	Latitude	Longitude	Population	Infected	Risk	Risk W	Vulner.	Vulner. W
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Fine Internet 100%



Epitrace





Thank you