

# Importancia sanitaria de roedores y lagomorfos

MAGRAMA, 18-19 septiembre 2012



Templo Karni Mata, India

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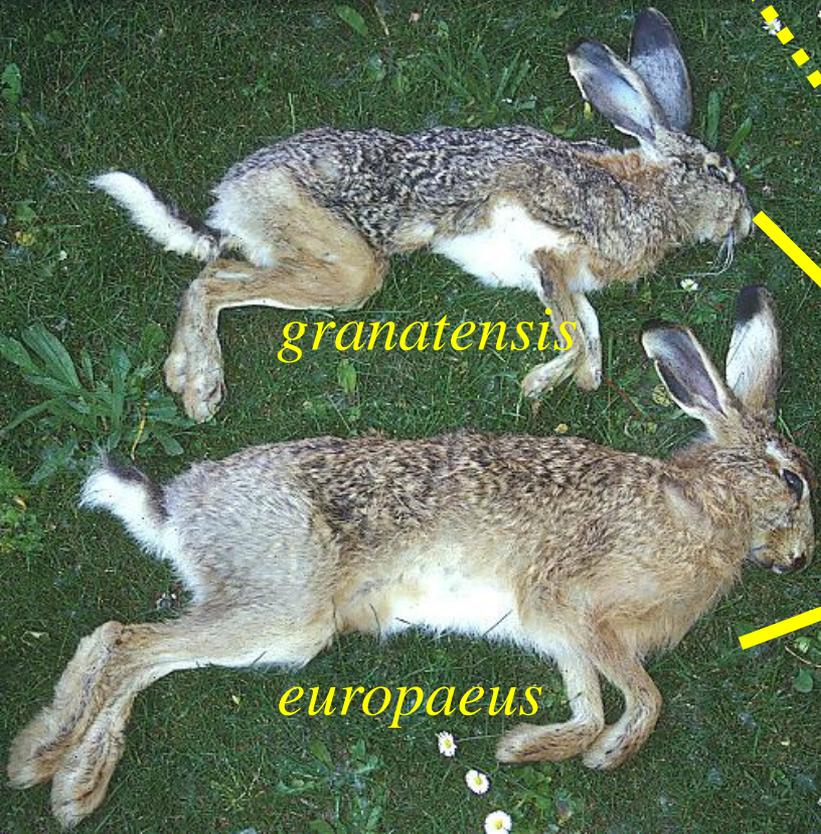
# Liebres (lagomorfos)



# 3 *Lepus* en la PI



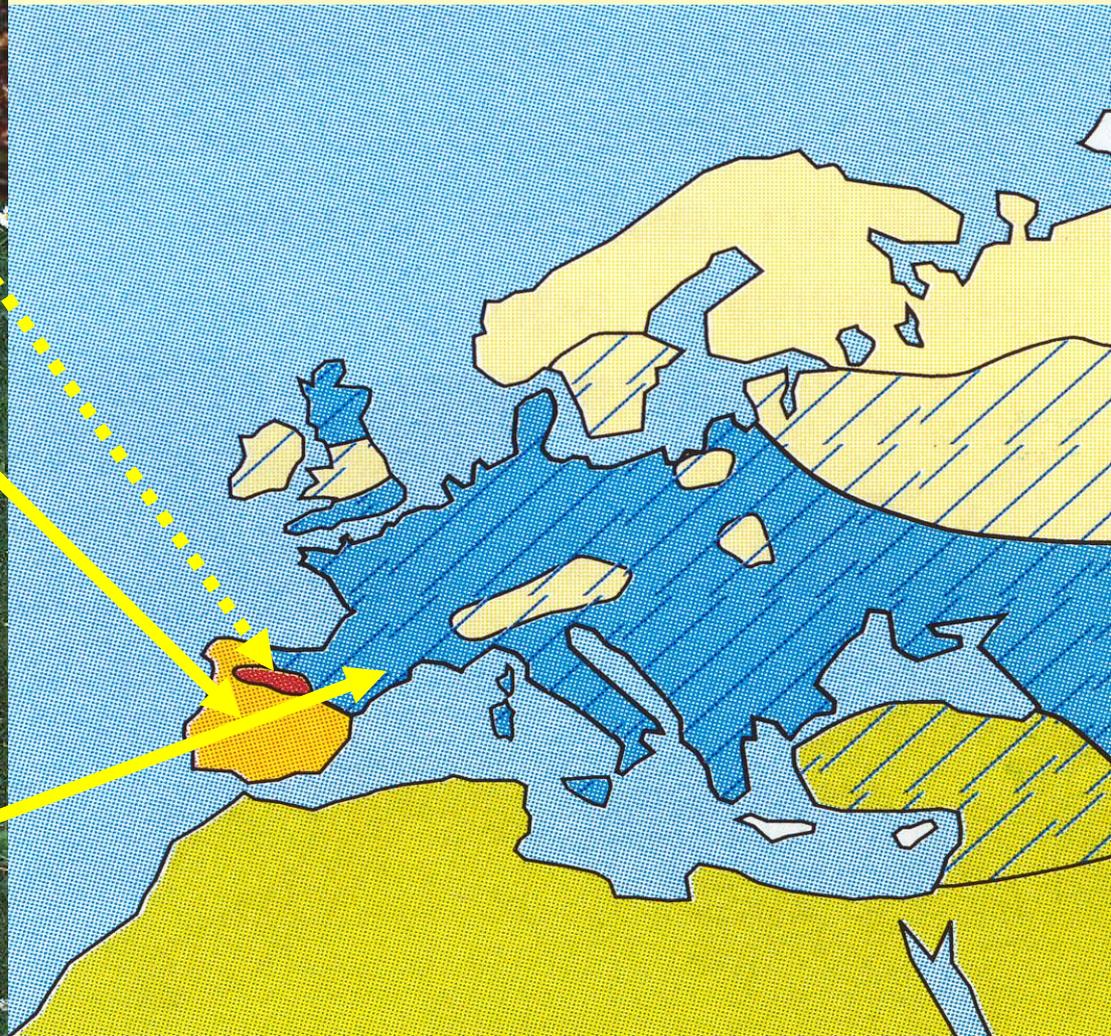
*castroviejoi*



*granatensis*



*europaeus*



# Conejos (lagomorfos)

- *Oryctolagus cuniculus*
- Dos variedades en España:
  - *O.c. cuniculus* (noreste)
  - *O.c. algirus* (suroeste)
- Presa fundamental, importante papel ecológico
- Prolífico y gregario



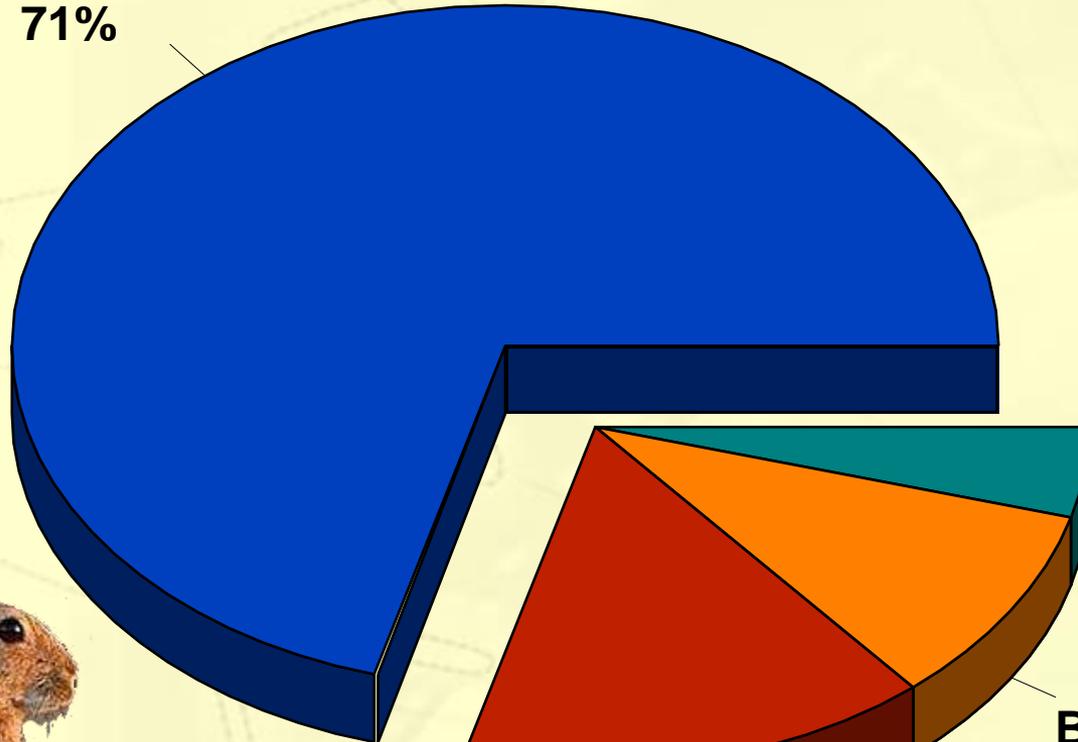


Se trasladan unos 500.000 conejos/año en España

C.Gortázar

# Enfermedades diagnosticadas en conejo (SEDIFAS)

E.H.C.  
71%



Parasitarias  
4%

Bacterianas  
10%

Mixomatosis  
15%



[GENÉTICOS]

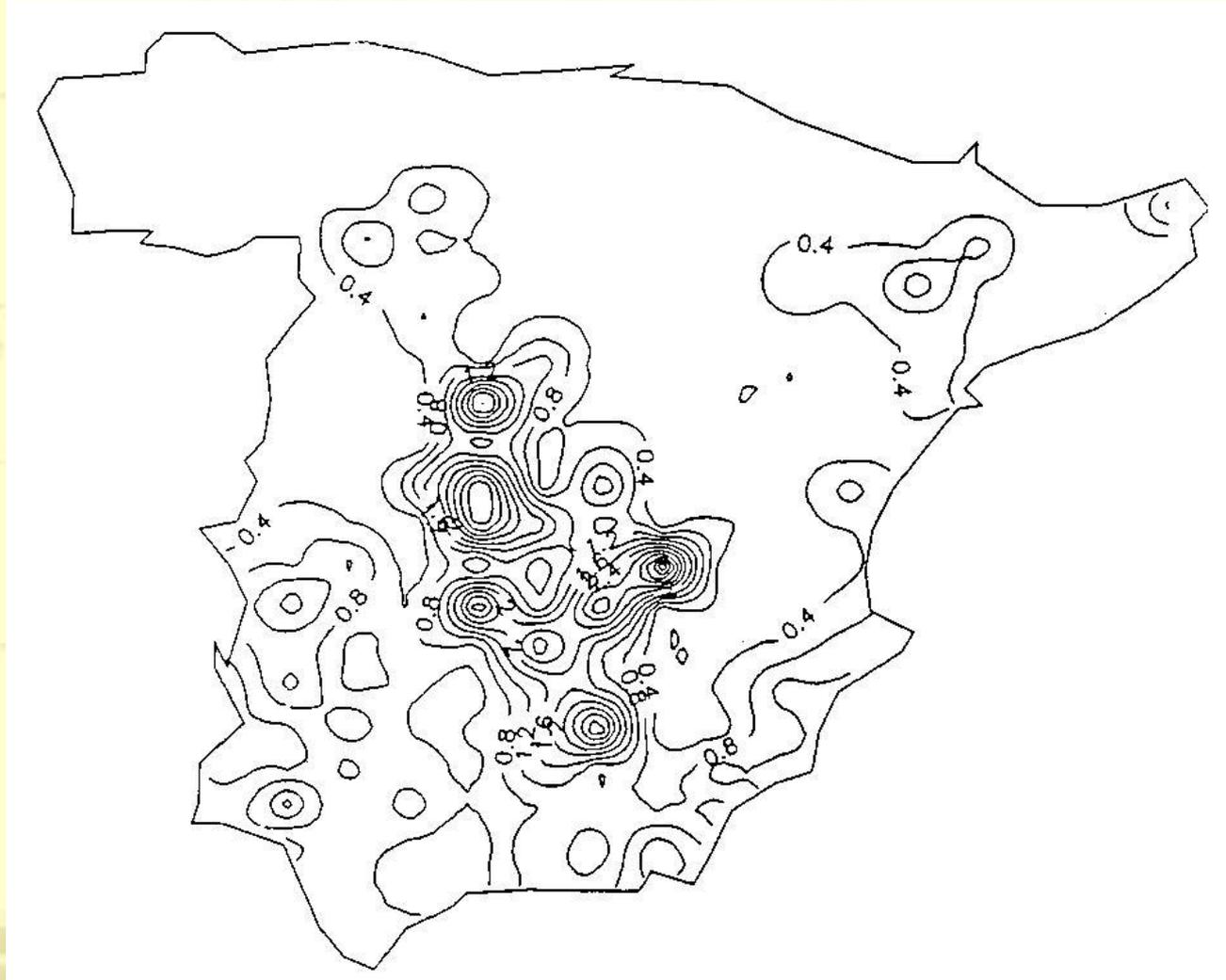


# Enfermedad hemorrágica del conejo (RHD)

- Etiología vírica
- Altamente contagiosa.
- También adultos.
- Más frec. octubre-mayo

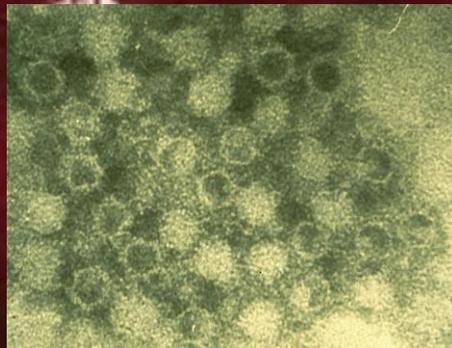
# Situación del conejo tras la RHD

(Blanco & Villafuerte, 1993)



# Síndrome de la fiebre parda europea (EBHS)

- Etiología vírica
- Altamente contagiosa. Curso agudo
- Hepatitis



# Zoonosis con implicación de roedores o lagomorfos

## Virus

Robovirus (rodent-borne viruses):

Arenavirus, **Hantavirus**

Arbovirus (arthropod-borne viruses):

Flavivirus (TBEv), **Virus de la fiebre hemorrágica de Crimea – Congo (CCHFv)**

(...)

## Bacterias

*Borrelia burgdorferi*

*Anaplasma phagocytophilum*

Spotted fever group rickettsiae

*Coxiella burnettii*

***Francisella tularensis***

*Yersinia* sp.

***Salmonella* sp.**

*Leptospira*

(...)

## Parásitos

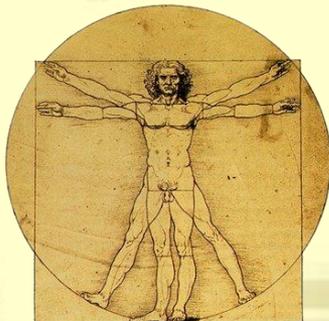
*Babesia microti*

***Leishmania infantum***

*Encephalitozoon cuniculi*

*Calodium hepaticum* (Syn. *Capillaria hepatica*)

(...)



# Hantavirus

Síndrome pulmonar por Hantavirus (HPS)

Sin Nombre Virus es el principal causante en EUA

TURISMO | Podría afectar a 10.000 personas

## Un virus mortal en el parque estadounidense Yosemite dispara una alerta sanitaria



**CNN U.S.** SEARCH  
powered by Google

ics Justice Entertainment Tech Health Living Travel Opinion iReport Money Sports

YOSEMITE NATIONAL PARK

### Yosemite records 17th death in an unusually fatal year

August 24, 2011 | By Michael Martinez and Casey Wian, CNN

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2,032 people recommend this. Be the first to recommend this.

Vista del parque de Yosemite, en California. | Kenny Karst

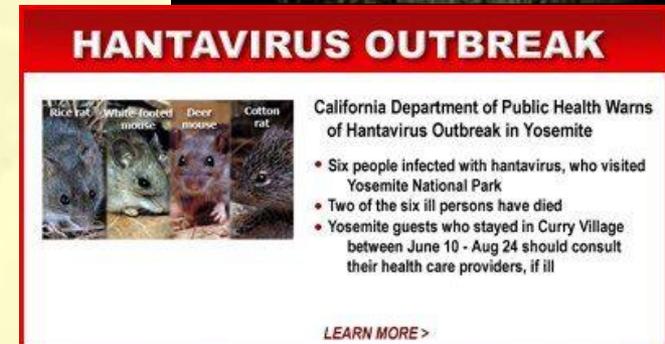
- Se trata de un patógeno que genera una grave enfermedad pulmonar
- Han fallecido dos personas y hay otras seis afectadas por la infección
- El riesgo está en los visitantes del parque entre el 10 de junio y el 24 de agosto



**19,000** visitors at Tuolumne

YOSEMITE VIRUS THREAT  
THREE DEAD AFTER VISIT  
TENS OF THOUSANDS AT RISK

abc NEWS .com



### HANTAVIRUS OUTBREAK

California Department of Public Health Warns of Hantavirus Outbreak in Yosemite

- Six people infected with hantavirus, who visited Yosemite National Park
- Two of the six ill persons have died
- Yosemite guests who stayed in Curry Village between June 10 - Aug 24 should consult their health care providers, if ill

LEARN MORE >



WEBCAST: Hantavirus at Yosemite National Park

Share More info

ta Clara County PUBLIC HEALTH

abc WORLD NEWS NOW

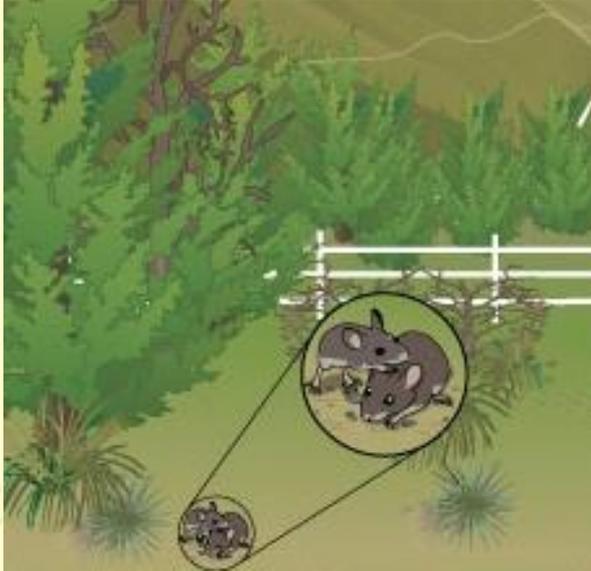
### DEADLY HANTAVIRUS

abc

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# Hantavirus

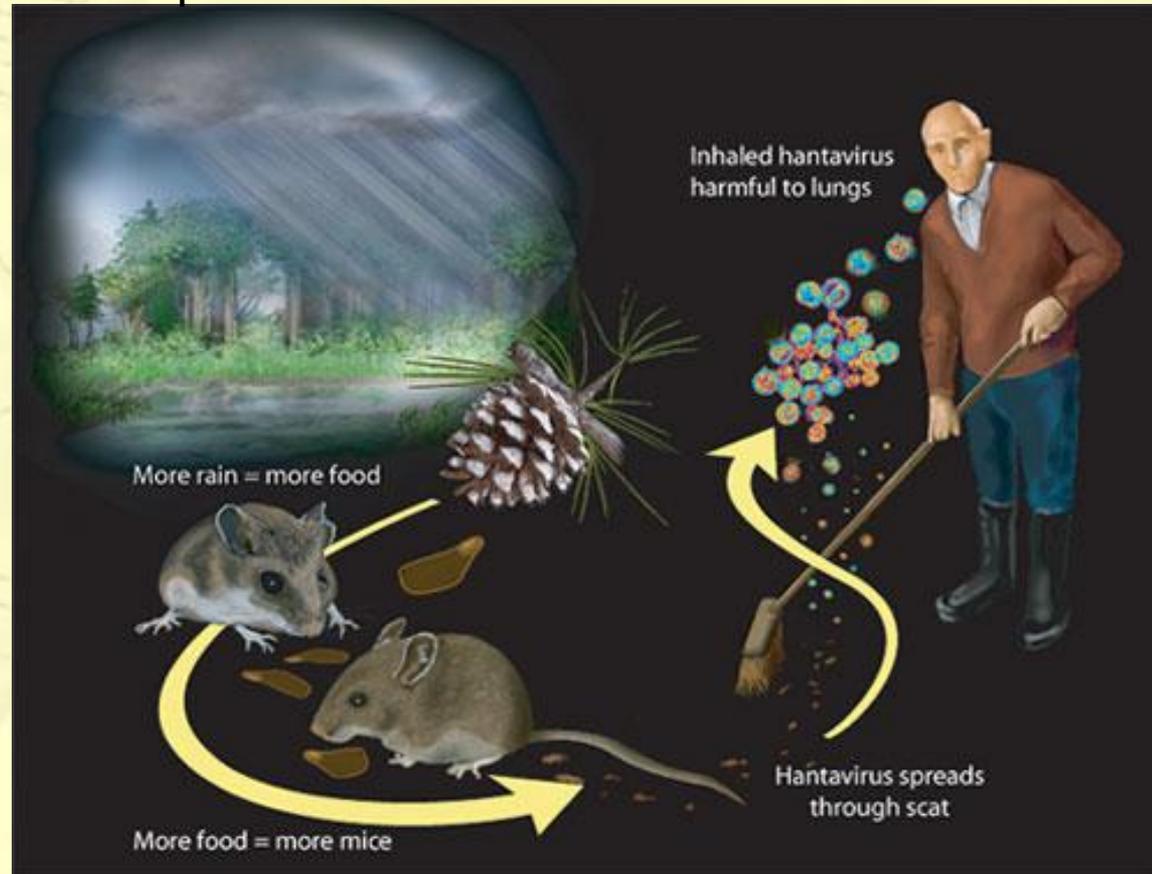
## Ciclo enzoótico



Local enzootic transmission of hantaviruses occurs at low levels during periods of unfavorable environmental conditions.

Favorable environmental conditions such as mild winters and summer rainfall may cause dramatic increases in rodent populations

## Ciclo epizoótico



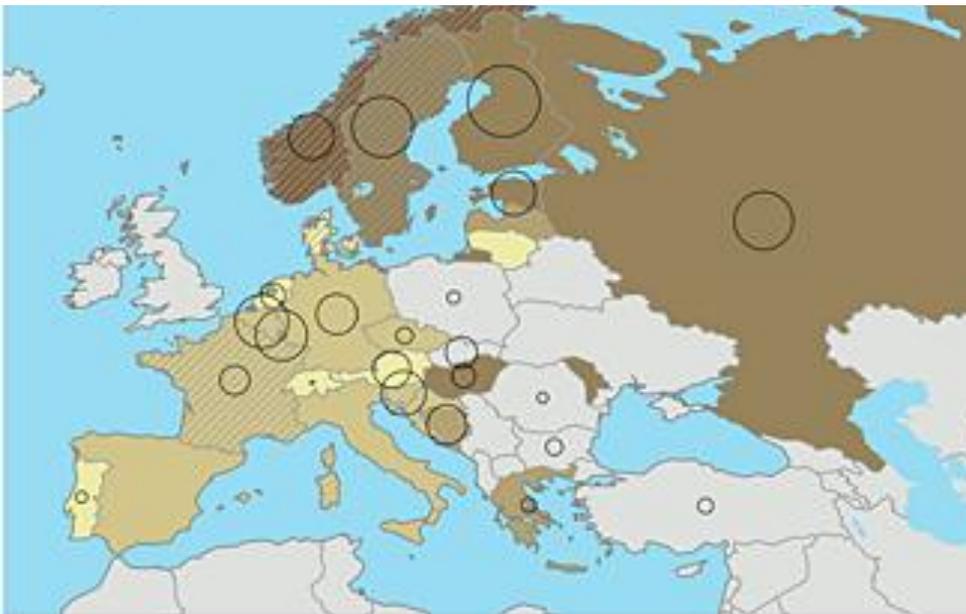
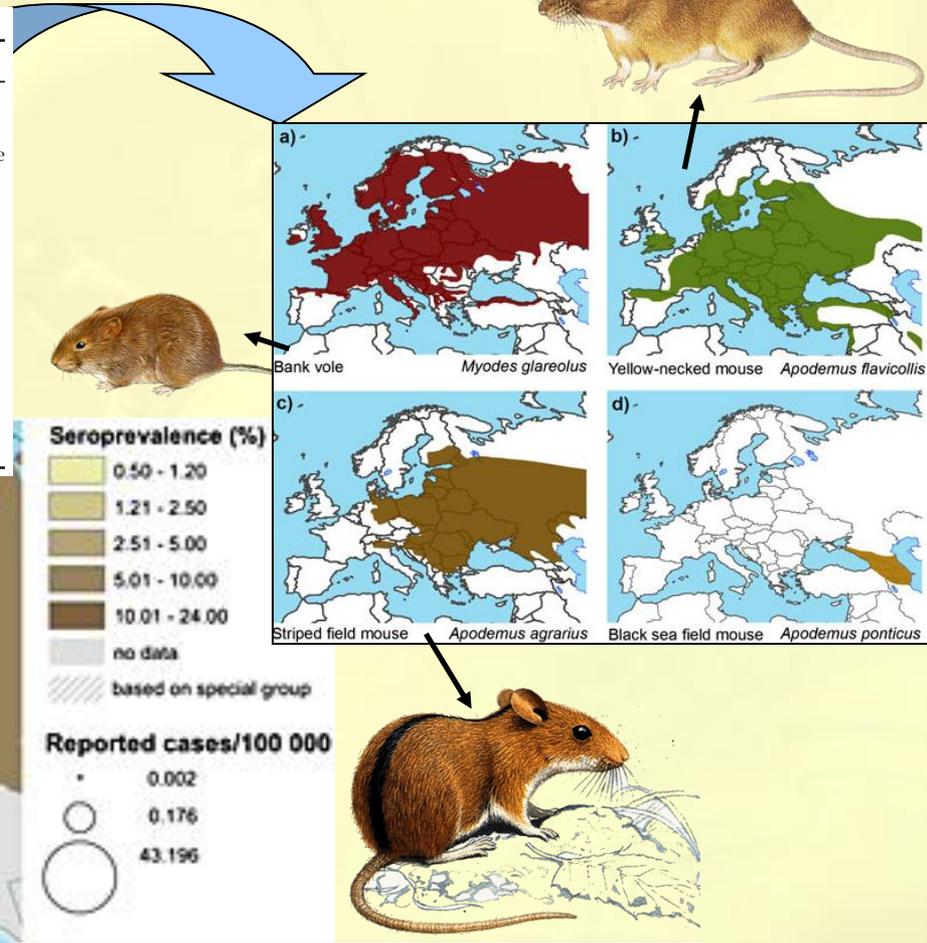
# Hantavirus en Europa

En Europa existen 5 Hantavirus distintos, asociados a FHS **Renal**



Table 1. Hantaviruses circulating in Europe

Virus	Carrier	Disease
Viruses carried by voles		
Puumala*	<i>Myodes glareolus</i> (bank vole)	HFRS (mild)
Tula*	<i>Microtus arvalis</i> , <i>M. levis</i> (common vole, sibling vole) other <i>Microtus</i>	Infects humans, HFRS in one case reported
Viruses carried by mice or rats		
Dobrava-Belgrade* (or DOBV-Af) (or DOBV- Ap)	<i>Apodemus flavicollis</i> (yellow-necked mouse) <i>Apodemus ponticus</i> (Black Sea field mouse)	HFRS (severe) HFRS (medium severity)
Saaremaa* (or DOBV-Aa)	<i>Apodemus agrarius</i> (striped field mouse)	HFRS (mild)
Seoul*	<i>Rattus norvegicus</i> , <i>R. rattus</i> (rat)	HFRS (medium severity)
Viruses carried by insectivores (Seewis, Nova)	No known human infection to date	



## Hantavirus infections in Europe and their impact on public health

Antti Vaheri<sup>1,2\*</sup>, Heikki Henttonen<sup>3</sup>, Liina Voutilainen<sup>1,3</sup>, Jukka Mustonen<sup>4,5</sup>, Tarja Sironen<sup>1</sup> and Olli Vapalahti<sup>1,2,6</sup>

# Hantavirus en Europa

¿Expansión geográfica? ¿Incremento en el tiempo? ¿o están de moda?

## International Journal of Health Geographics



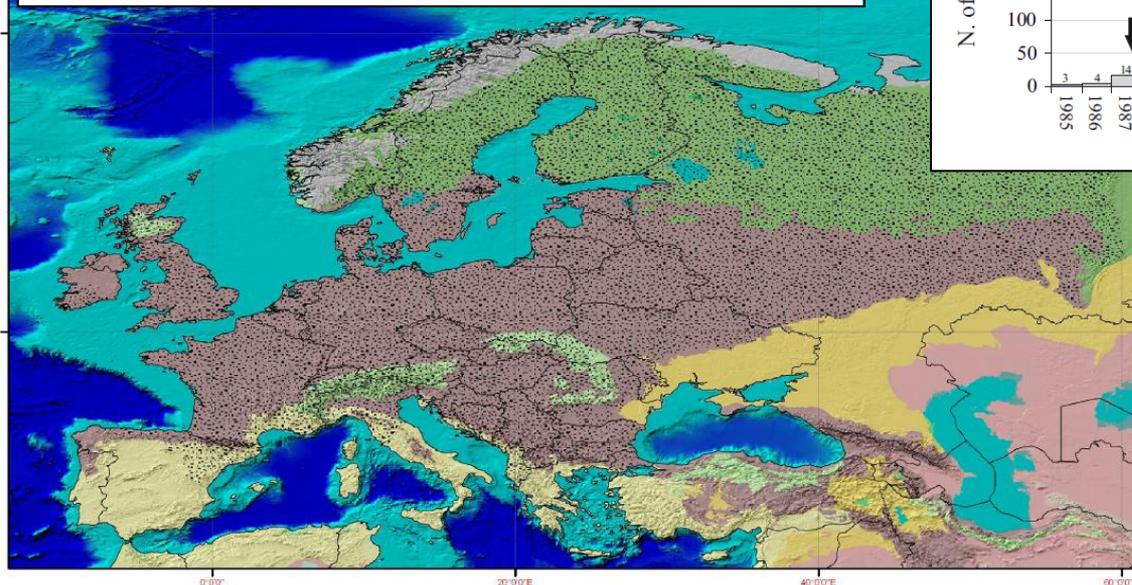
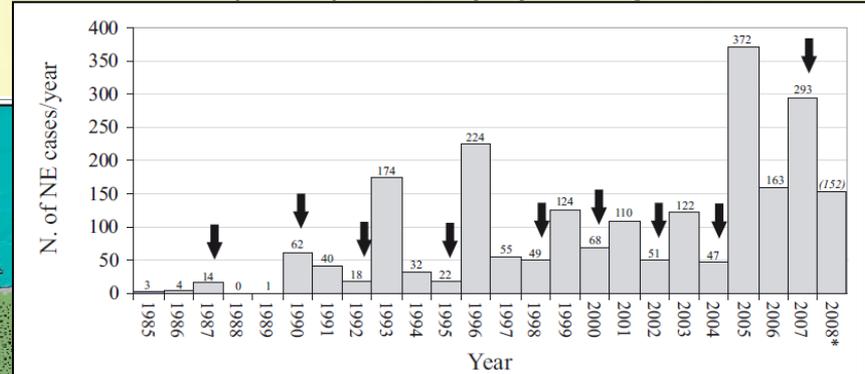
Research

Open Access

**Relating increasing hantavirus incidences to the changing climate: the mast connection**

Jan Clement\*<sup>1</sup>, Jurgen Vercauteren<sup>1</sup>, Willem W Verstraeten<sup>2</sup>, Geneviève Ducoffre<sup>3</sup>, José M Barrios<sup>2</sup>, Anne-Mieke Vandamme<sup>1</sup>, Piet Maes<sup>1</sup> and Marc Van Ranst<sup>1</sup>

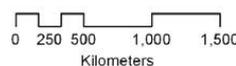
Casos de Nefropatía epidémica (NE) en Bélgica 1985-2008



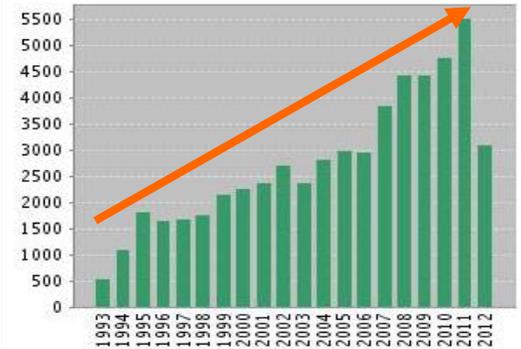
### Puumala virus

#### Legend

- Tundra
- Boreal Forests/Taiga
- Temperate Broadleaf and Mixed Forests
- Deserts and Xeric Shrublands
- Temperate Grasslands, Savannas, and Shrublands
- NE distribution zone



Citations in Each Year



The latest 20 years are displayed.

[View a graph with all years.](#)

# ¿Hantavirus en España?

Vector-Borne and Zoonotic Diseases

Volume 11, Issue 6, 1 June 2011, Pages 697-700

## Seroepidemiological survey of hantavirus infection in healthy people in Vallès Occidental, Barcelona

Sanfeliu, I.<sup>a</sup>, Nogueras, M.M.<sup>b</sup>, Gegúndez, M.I.<sup>c</sup>, Segura, F.<sup>bd</sup>, Lledó, L.<sup>c</sup>, Font, B.<sup>b</sup>, Saz, J.V.<sup>c</sup>

<sup>a</sup> UDIAT Diagnostic Center, Corporació Sanitària Parc Taulí, Par Tauló s/n, Sabadell 08208, Spain

<sup>b</sup> Department of Infectious Diseases, Hospital Universitari Parc Taulí, Sabadell, Spain

<sup>c</sup> Department of Microbiology and Parasitology, Faculty of Medicine Universidad de Alcalá, Alcalá de Henares, Spain

<sup>d</sup> Department of Medicine, Universitat Autònoma de Barcelona, Barcelona, Spain

JOURNAL OF  
CLINICAL  
VIROLOGY

Journal of Clinical Virology 27 (2003) 296–307

www.elsevier.com/locate/jcv

Hantavirus infections in Spain: analysis of sera from the general population and from patients with pneumonia, renal disease and hepatitis

Lourdes Lledó<sup>a</sup>, Jonas Klingström<sup>b,c</sup>, María Isabel Gegúndez<sup>a</sup>,  
Angelina Plyusnina<sup>d</sup>, Olli Vapalahti<sup>d</sup>, Jose Vicente Saz<sup>a</sup>, María Beltrán<sup>a</sup>,  
Katarina Brus Sjölander<sup>b,c</sup>, Antti Vaheri<sup>d</sup>, Alexander Plyusnin<sup>b,d</sup>,  
Åke Lundkvist<sup>b,c,\*</sup>

*Am. J. Trop. Med. Hyg.*, 77(2), 2007, pp. 371–375  
Copyright © 2007 by The American Society of Tropical Medicine and Hygiene

## Prevalence of Anti-Hantavirus Antibodies in Patients with Hypertransaminemia in Madrid (Spain)

Lourdes Lledó,\* María Isabel Gegúndez, Juan Ledesma, Cristina Domingo, Rosario González, Juan Romanyk, José Vicente Saz, and María Beltrán

Department of Microbiology and Parasitology, Faculty of Medicine, University of Alcalá, Alcalá de Henares, Spain; Laboratory of Arboviruses and Imported Viral Diseases, Diagnostic Microbiology Service, National Center for Microbiology, Health Institute "Carlos III", Majadahonda, Spain; Department of Microbiology, Hospital "Príncipe de Asturias", Alcalá de Henares, Spain



*Microtus arvalis*



Bank vole



*Myodes glareolus*



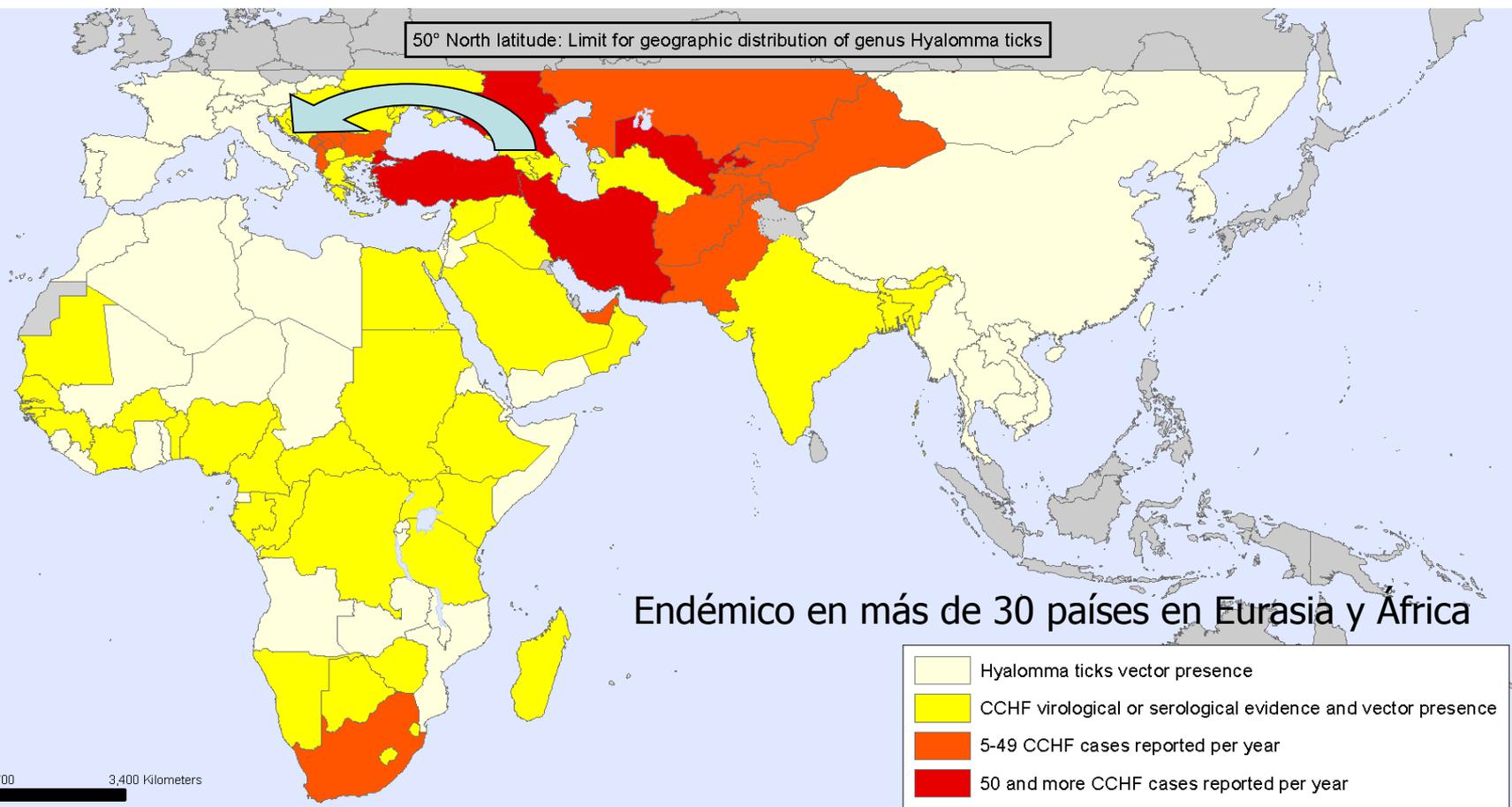
Yellow-necked mouse *Apodemus flavicollis*



# Fiebre hemorrágica de Crimea-Congo (CCHF)

2008

Geographic distribution of Crimean-Congo Haemorrhagic Fever



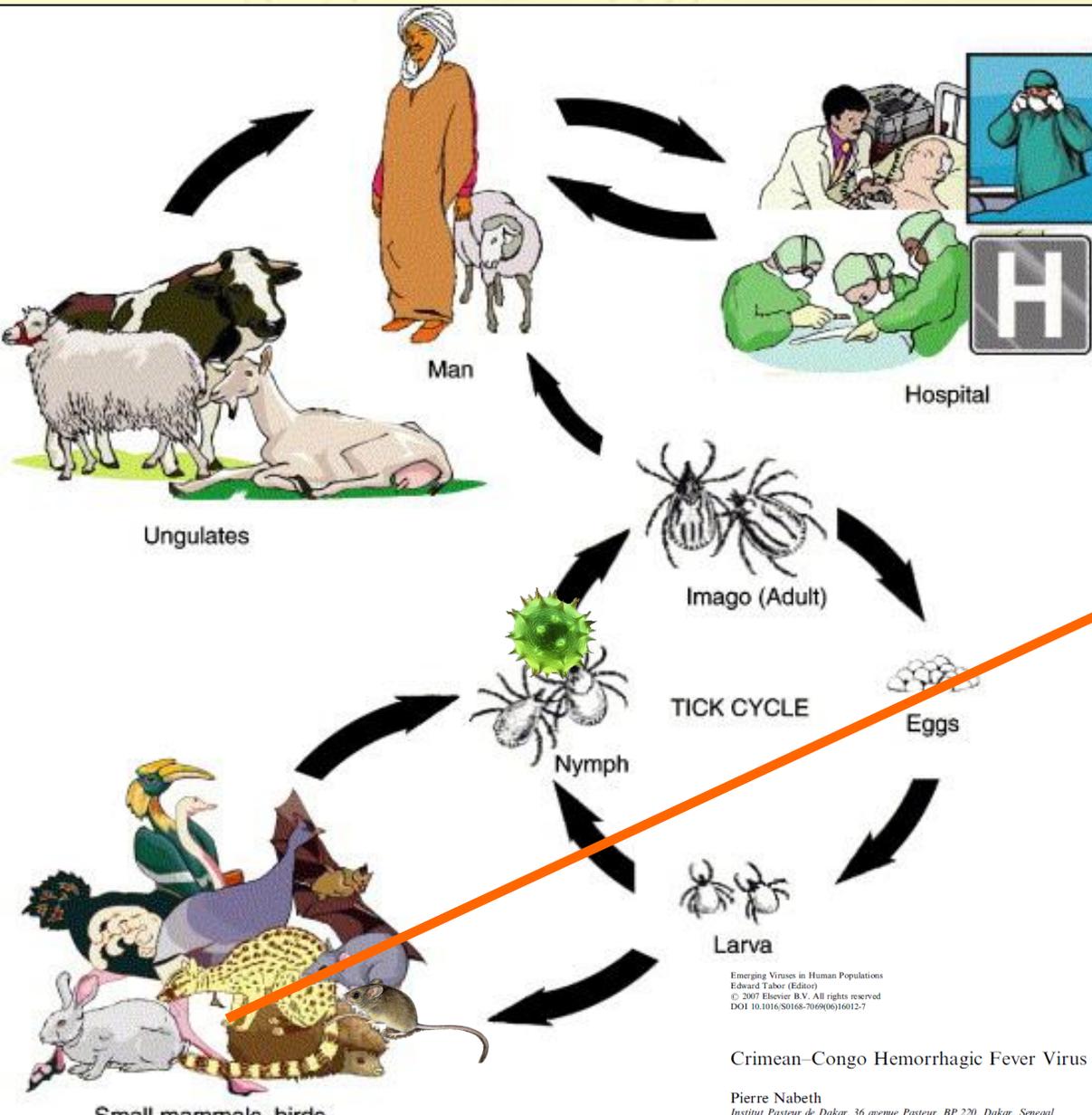
The boundaries and names shown and the designations used on this map do not imply the expression of any opinion whatsoever on the part of the World Health Organization concerning the legal status of any country, territory, city or area or of its authorities, or concerning the delimitation of its frontiers or boundaries. Dotted lines on maps represent approximate border lines for which there may not yet be full agreement.

Data Source: World Health Organization  
Map Production: Public Health Information  
and Geographic Information Systems (GIS)  
World Health Organization



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# Fiebre hemorrágica de Crimea-Congo (CCHF)



Los conejos son clave para mantener *Hyalomma*



# CCHFV en Europa

Maltezos and Papa *BMC Medicine* 2011, 9:131  
<http://www.biomedcentral.com/1741-7015/9/131>



COMMENTARY Open Access

## Crimean-Congo hemorrhagic fever: epidemiological trends and controversies in treatment

Helena C. Maltezos<sup>1\*</sup> and Anna Papa<sup>2</sup>



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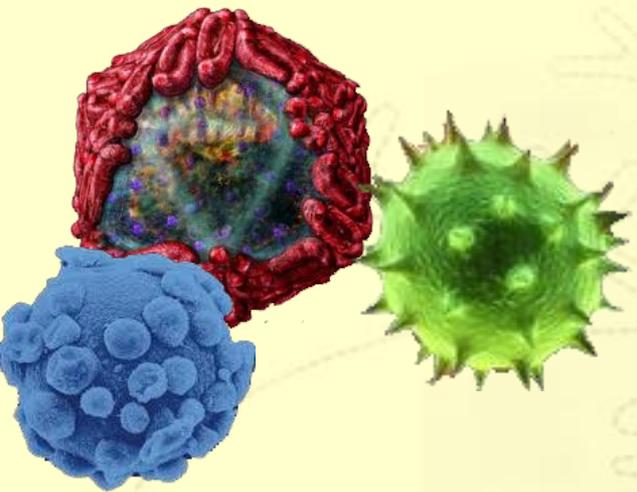
Volume 18, Number 1—January 2012

Letter

Crimean-Congo Hemorrhagic Fever Virus in Ticks, Southwestern Europe, 2010



Foci of CCHFV emergence or re-emergence in southeast Europe and neighboring countries from 2000.



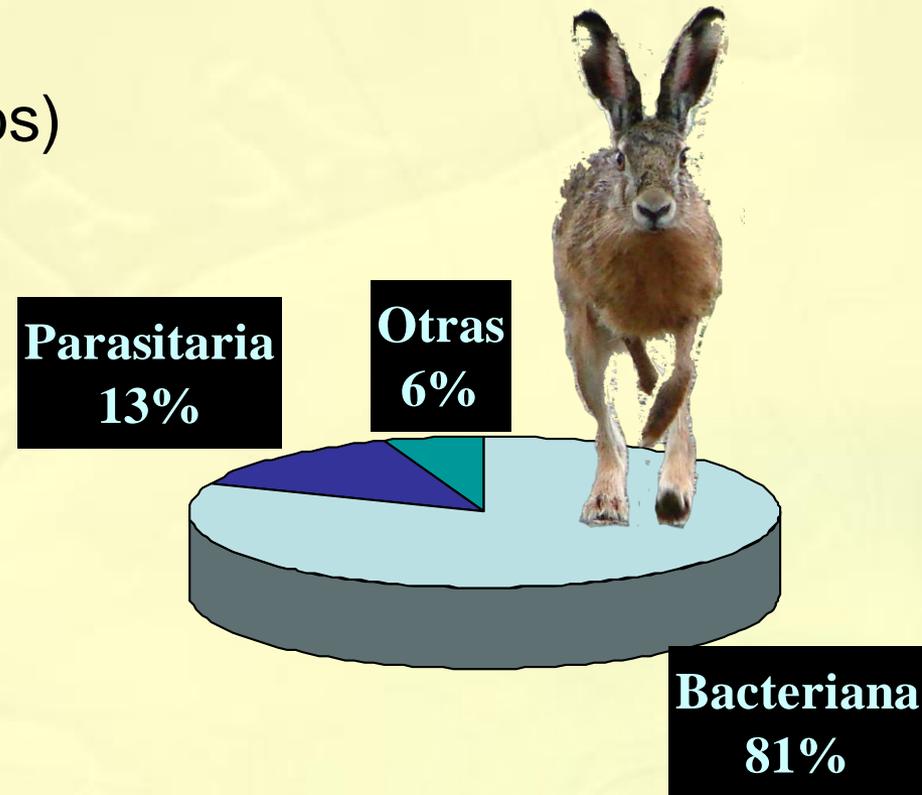
Dejamos los virus...

**IREC**

[INSTITUTO DE INVESTIGACIÓN EN RECURSOS CINEGÉTICOS]

# Enfermedades diagnosticadas en liebres ibéricas (SEDIFAS-IREC, antes de 2004)

- Tularemia (26 casos)
- Pseudo TB/Yersiniosis (11 casos)
- Coccidiosis (5 casos)
- Pasterelosis (4 casos)
- Envenenamientos (3 casos)
- Miasis (2 casos)
- Staphillococciosis (2 casos)
- Colibacilosis (1 caso)

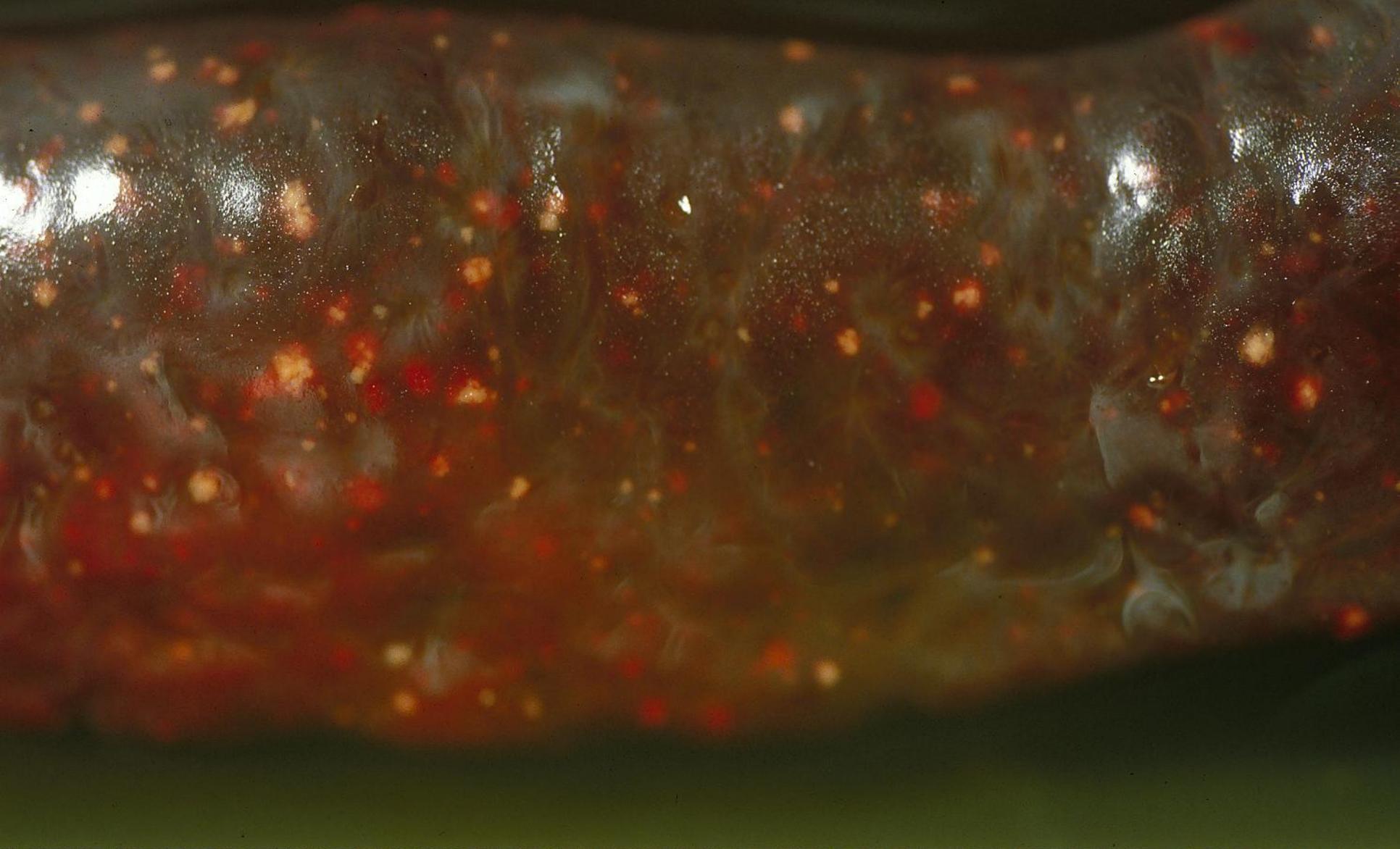


# Tularemia

- Causado por *Francisella tularensis*
- Frecuentemente asociado a entornos acuáticos o riparios
- En España: liebre ibérica, topillo, cangrejo de río
- Transmisión
  - Contacto (heridas, mucosas...)
  - Vectores mecánicos: mosquitos, garrapatas
  - Inhalación



# TULAREMIA



# TULAREMIA



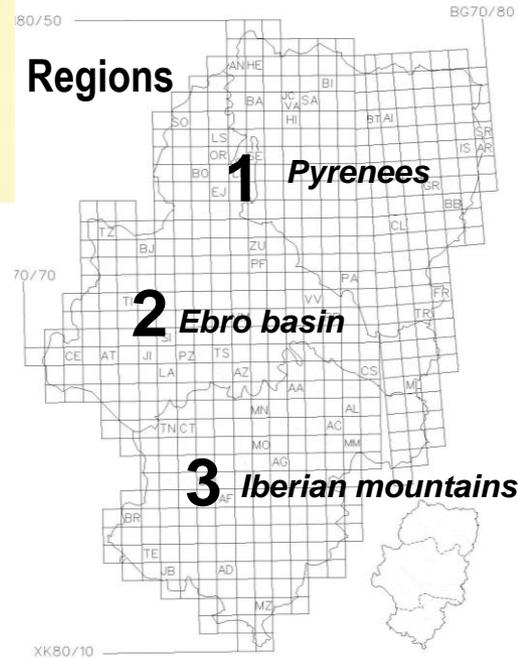
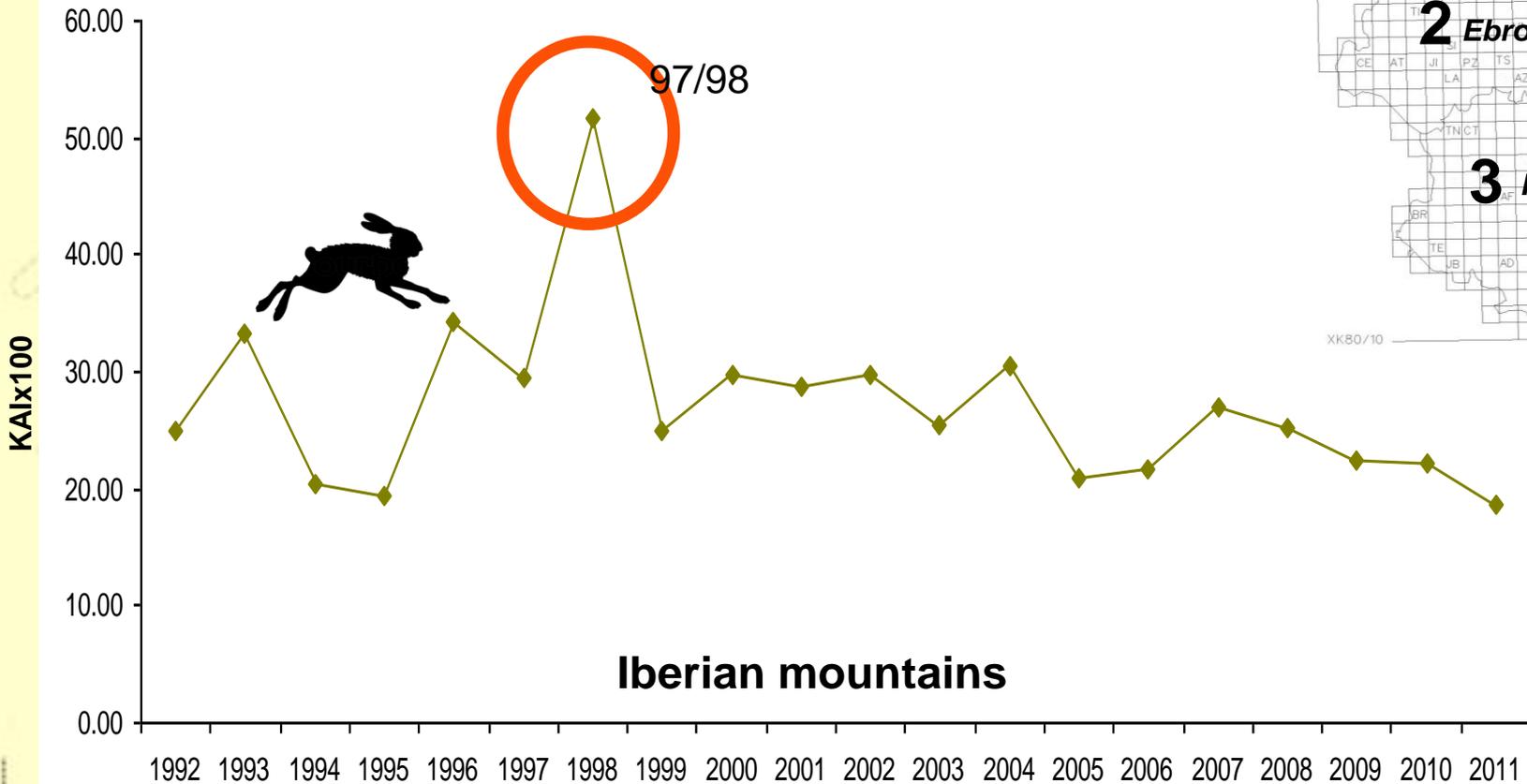
# Tularemia en España

- 2 brotes importantes en CyL:
  - 1997/98, asociado a liebres ibéricas (585 personas afectadas)
  - 2007/08, asociado a topillos (507 casos confirmados<sup>1</sup>)
- Casos esporádicos diagnosticados en liebres en muchos otros años, al menos desde 1994 (¡y también en conejos!)
- Brote en CLM asociado a cangrejos de río (2000, con casos posteriores)

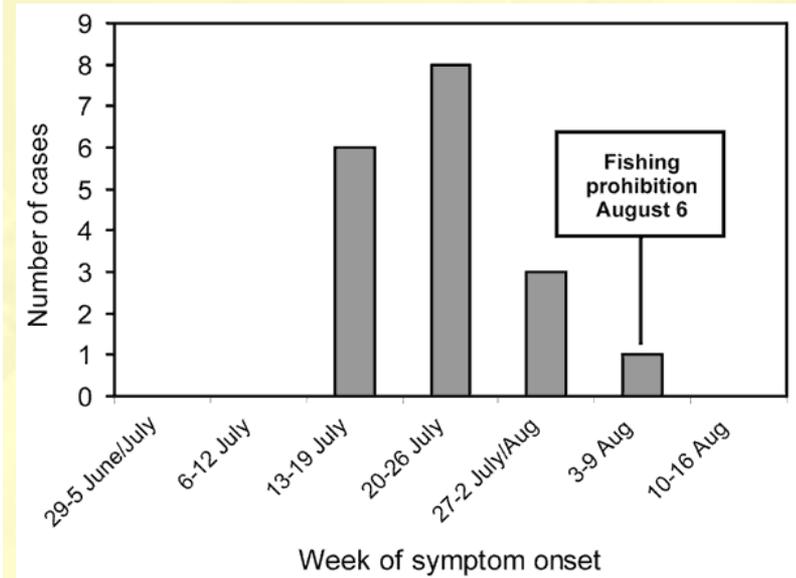
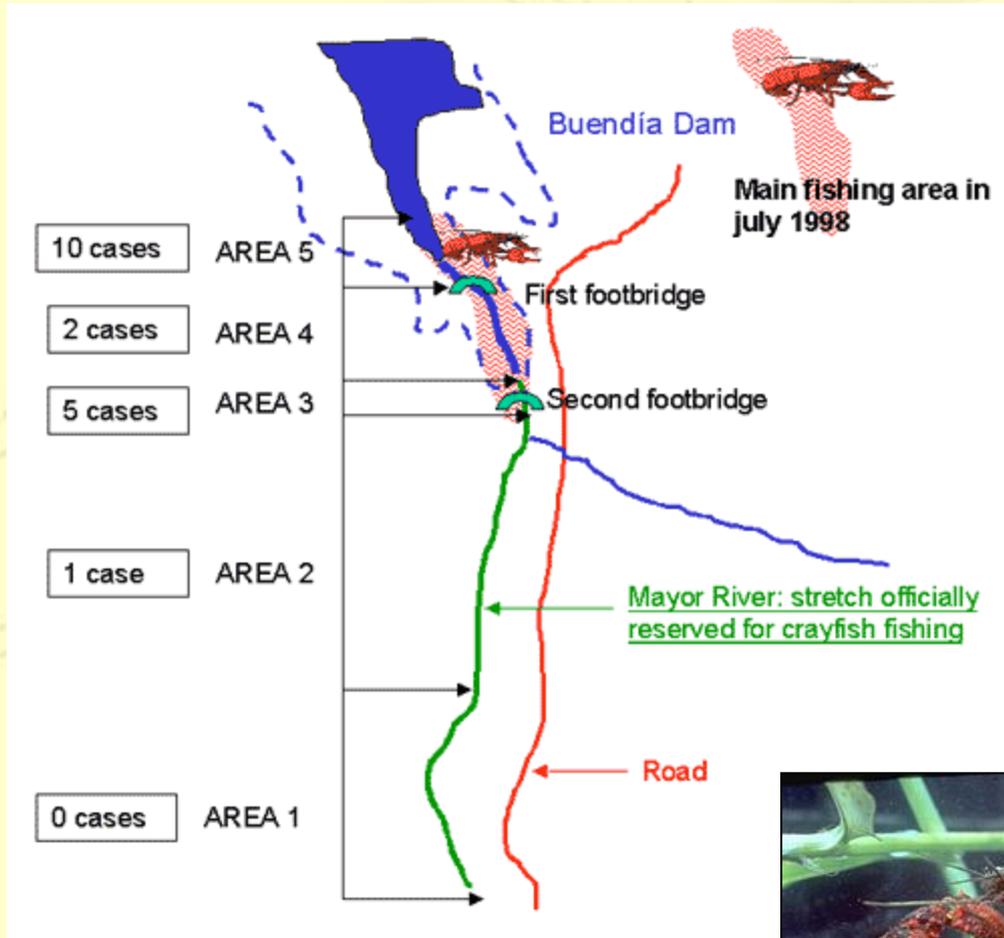


# Tendencias poblacionales Aragón, 1992-2011:

## Monitorización de las poblaciones de liebre ibérica



# Tularemia en España

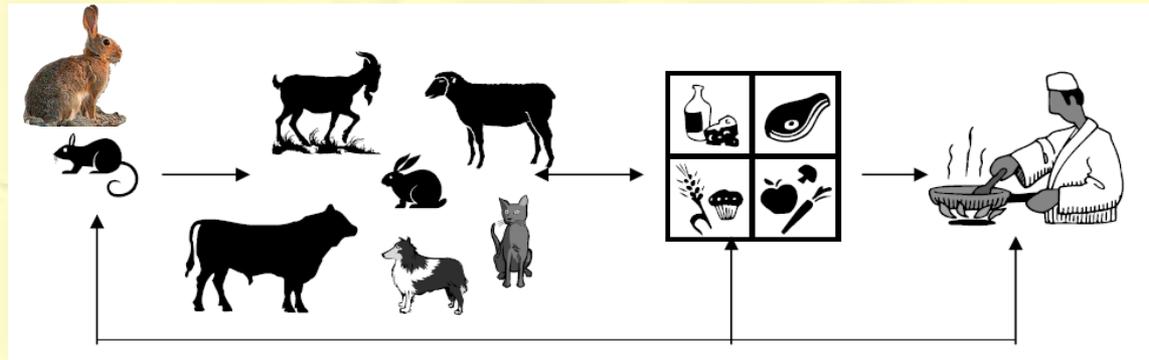


# PSEUDOTB/YERSINIOSIS

- *Yersinia pseudotuberculosis*
- Agua y alimento contaminados por heces
- Más común en épocas húmedas
- Linfadenitis
- Focos necróticos en hígado, bazo, válvula...
- Menos común en conejo

# Salmonellosis

- *Salmonella* Typhi-murium!
- Problemática en granjas → cadena alimentaria
- Ratones como factor de riesgo, pero también conejos<sup>1</sup>



[Zoonoses Public Health](#), 2008 Oct;55(8-10):481-7.

**A multi-state *Salmonella* Typhimurium outbreak associated with frozen vacuum-packed rodents used to feed snakes.**

[Fuller CC](#), [Jawahir SL](#), [Leano FT](#), [Bidol SA](#), [Signs K](#), [Davis C](#), [Holmes Y](#), [Morqan J](#), [Teltow G](#), [Jones B](#), [Sexton RB](#), [Davis GL](#), [Braden CR](#), [Patel NJ](#), [Deasy MP](#) 3rd, [Smith KE](#).

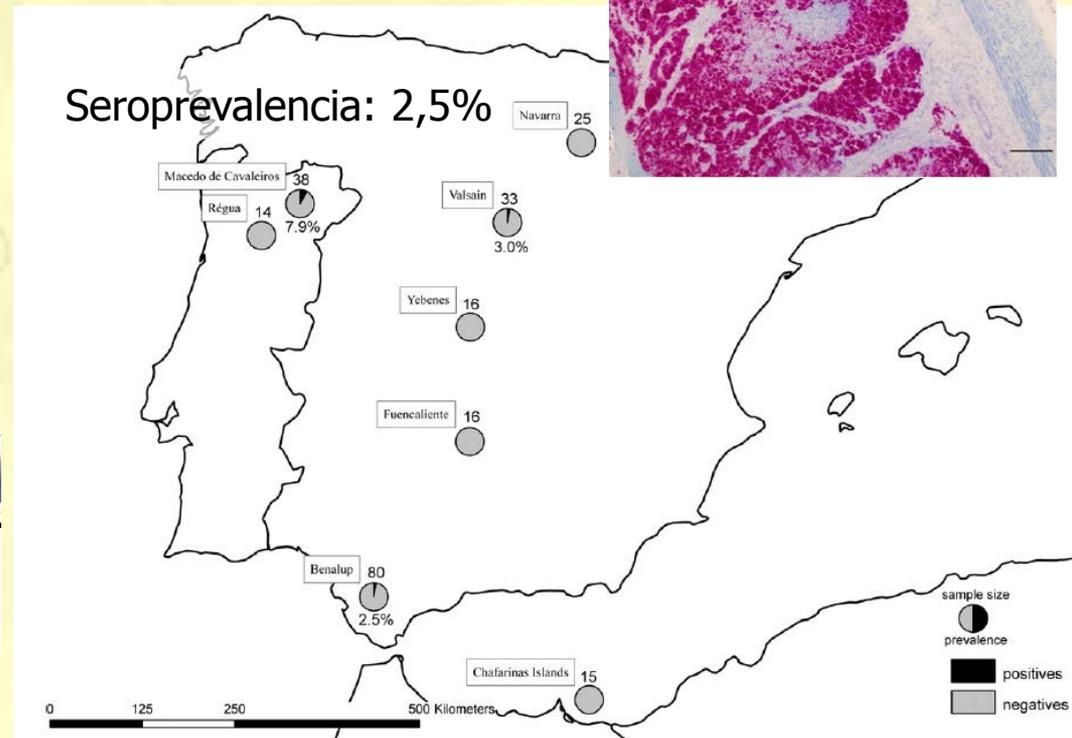
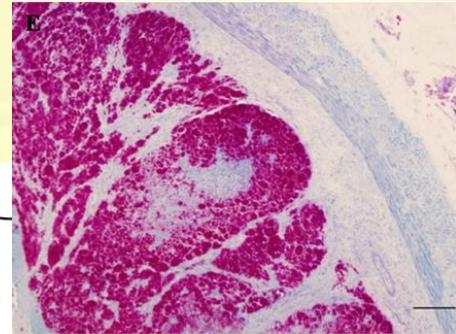
Minnesota Department of Health, Acute Disease Investigation and Control Section, St. Paul, MN 55164, USA. [Candace.Fuller@health.state.mn.us](mailto:Candace.Fuller@health.state.mn.us)

Stephen Mally fo

Frozen mice sold as reptile food have been linked to hundreds of cases of salmonella in the United States

# Paratuberculosis y conejos

- Se han descrito infecciones naturales en pastos compartidos (Ej. Escocia)
- Estudio en la PI:
  - 2/80 lesiones compatibles
  - 1/80 PCR +
  - Ningún cultivo +



Research in Veterinary Science

journal homepage: [www.elsevier.com/locate/rvsc](http://www.elsevier.com/locate/rvsc)

Paratuberculosis in European wild rabbits from the Iberian Peninsula

Elisa Maio<sup>a,b</sup>, Tania Carta<sup>a,\*</sup>, Ana Balseiro<sup>c</sup>, Iker A. Sevilla<sup>d</sup>, Angelo Romano<sup>e</sup>, José Antonio Ortiz<sup>f</sup>, Madalena Vieira-Pinto<sup>b</sup>, Joseba M. Garrido<sup>d</sup>, Jose Manuel Pérez de la Lastra<sup>a</sup>, Christian Gortázar<sup>a</sup>

# Leishmaniasis y liebres



- Brote Fuenlabrada, más de **260** casos registrados<sup>1</sup>
- Relacionado con aumento de poblaciones de liebre ibérica en parques colindantes, capaces de infectar *Phlebotomus perniciosus* con *L. infantum*<sup>2</sup>
- Prevalencia de ADN de *L. infantum* en liebres:  $43,6 \pm 10\%$ <sup>3</sup>

- Positivos en todas las áreas analizadas



# Conclusiones

- ✓ Importancia de factores relacionados con dinámica de poblaciones, ambiente cambiante
- ✓ Monitorización de las poblaciones y de las enfermedades
- ✓ Conjunto de especies (y algunas enfermedades) menos conocidas:  
Necesidad de investigación

**GRACIAS**

