



# West Nile Disease

World situation and impact on  
public health





# Contents

- **Global view** on WNV
- The **Public Health** consequences: the case of USA
- WNV circulation in **Europe** and **Mediterranean Basin**





# West Nile Disease “back to the future”

➤ Between **1950 and 1994** West Nile Virus (WNV) has been sporadically detected in:

- ✓ **Europe** (Spain, Portugal, France, Russia, Romania and Czech Rep.)
- ✓ **Africa** (South Africa, Senegal and Kenya)
- ✓ **Middle East** (Israel, Iran)
- ✓ **Asia** (India)





# West Nile Disease “back to the future”

## ➤ Clinical signs in:

✓ **Israel 1957** (human cases)

✓ **Camargue 1962** (horses)

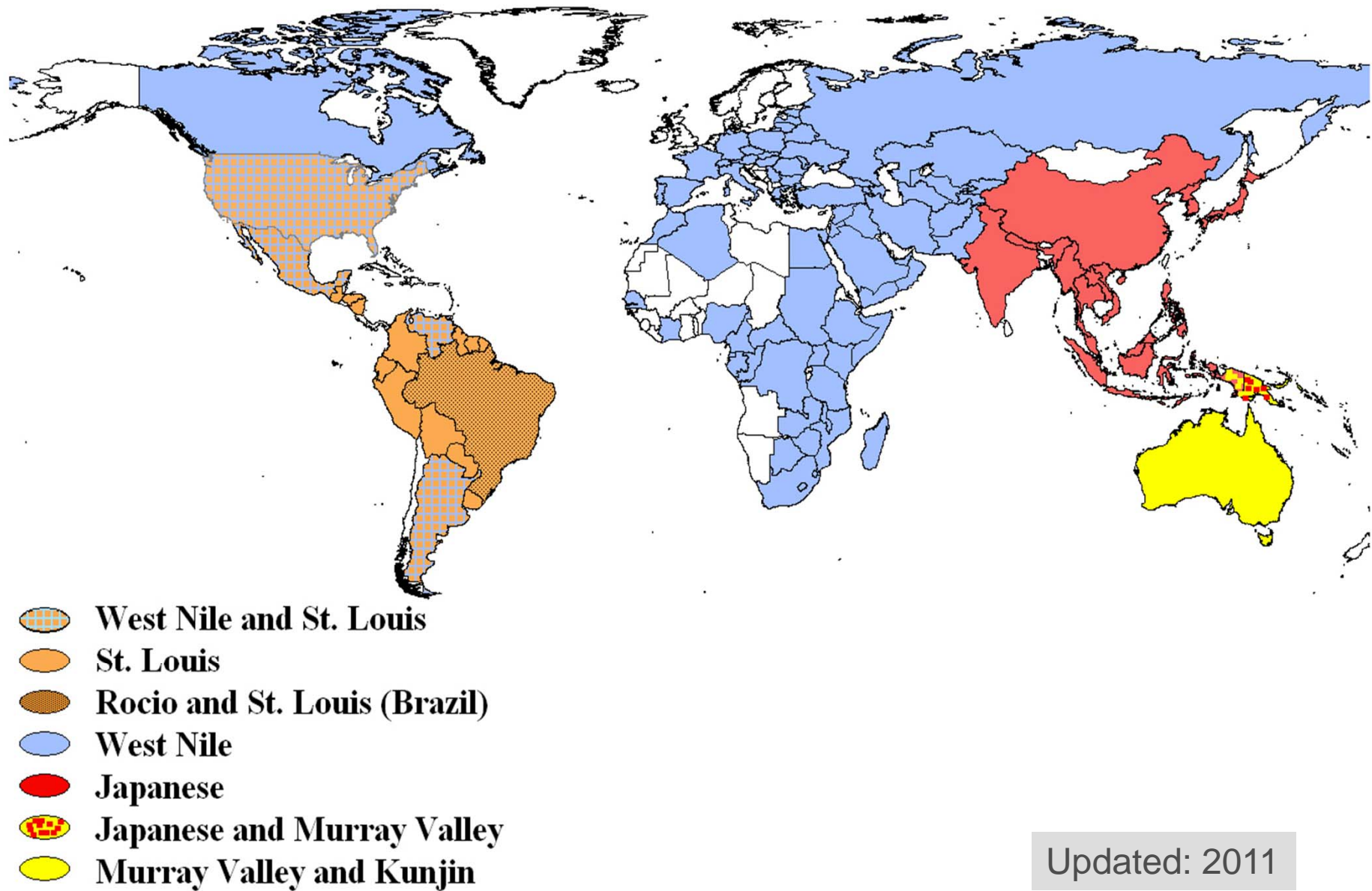
## ➤ Since 90s:

✓ **more frequent** outbreaks in the **Mediterranean Basin** with clinical signs in horses





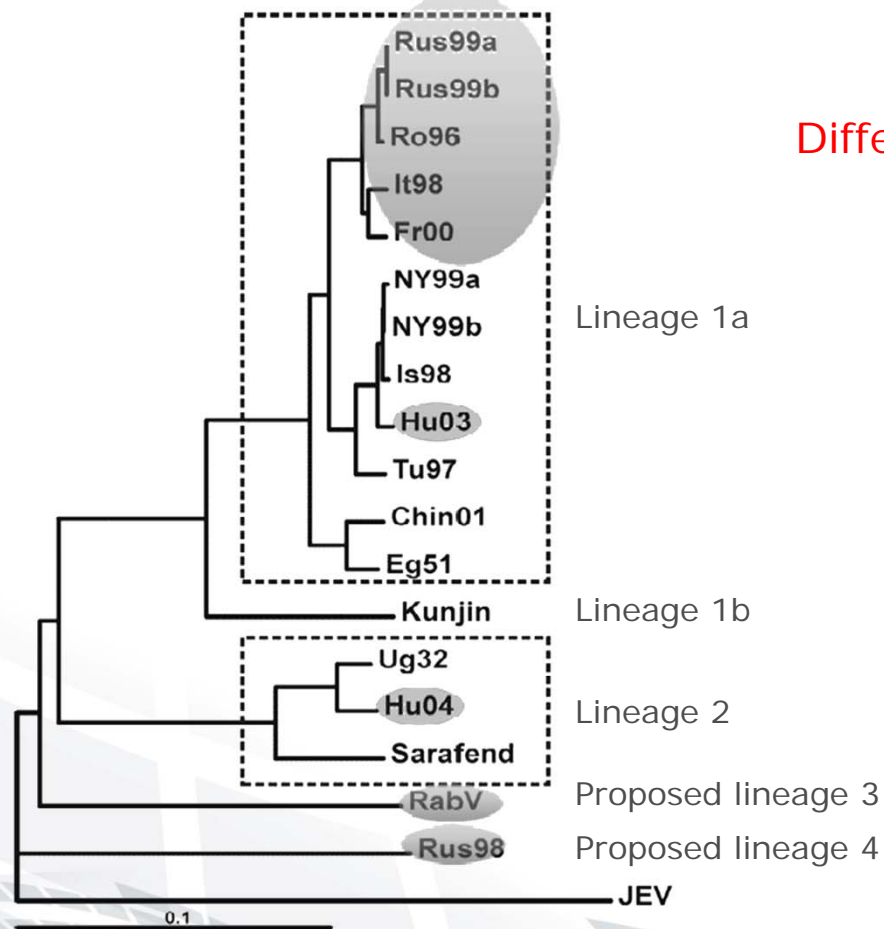
## Japanese encephalitis “sero-complex” viruses



Updated: 2011



Whole viral genome  
(Bakonyi *et al.*, EID, 2006)



# WNV: classification

Different strains



Different virulence

**Lineage 1:** worldwide distribution:  
West Africa, Middle East, East and  
Southern Europe, America and  
Australia

**Lineage 2:** Africa, Senegal, Uganda,  
R.C.A., Kenya, Madagascar, Central  
Europe

**Lineage 3 e 4:** Central Europe

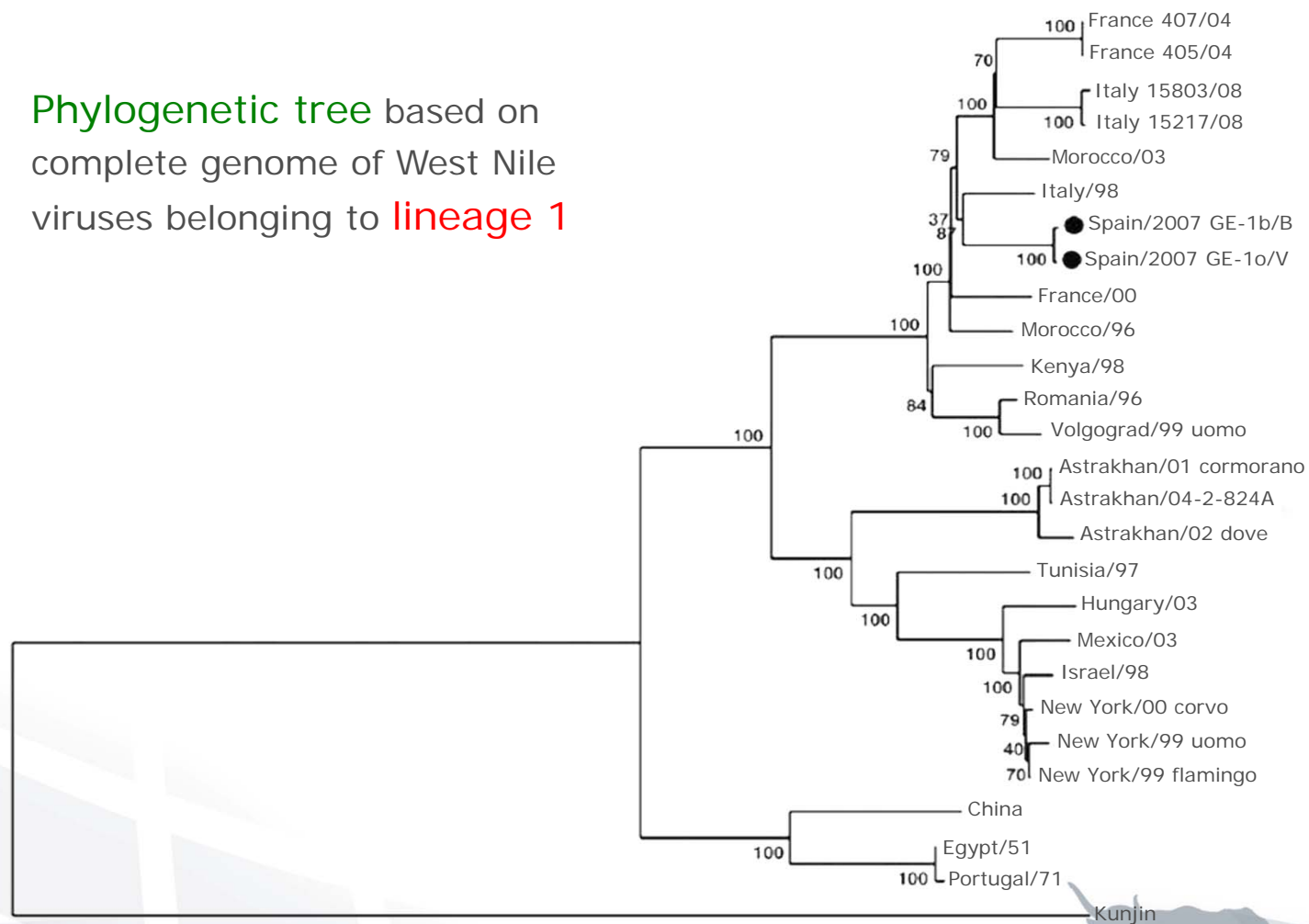
**Lineage 5:** Indian strains





Phylogenetic tree based on complete genome of West Nile viruses belonging to **lineage 1**

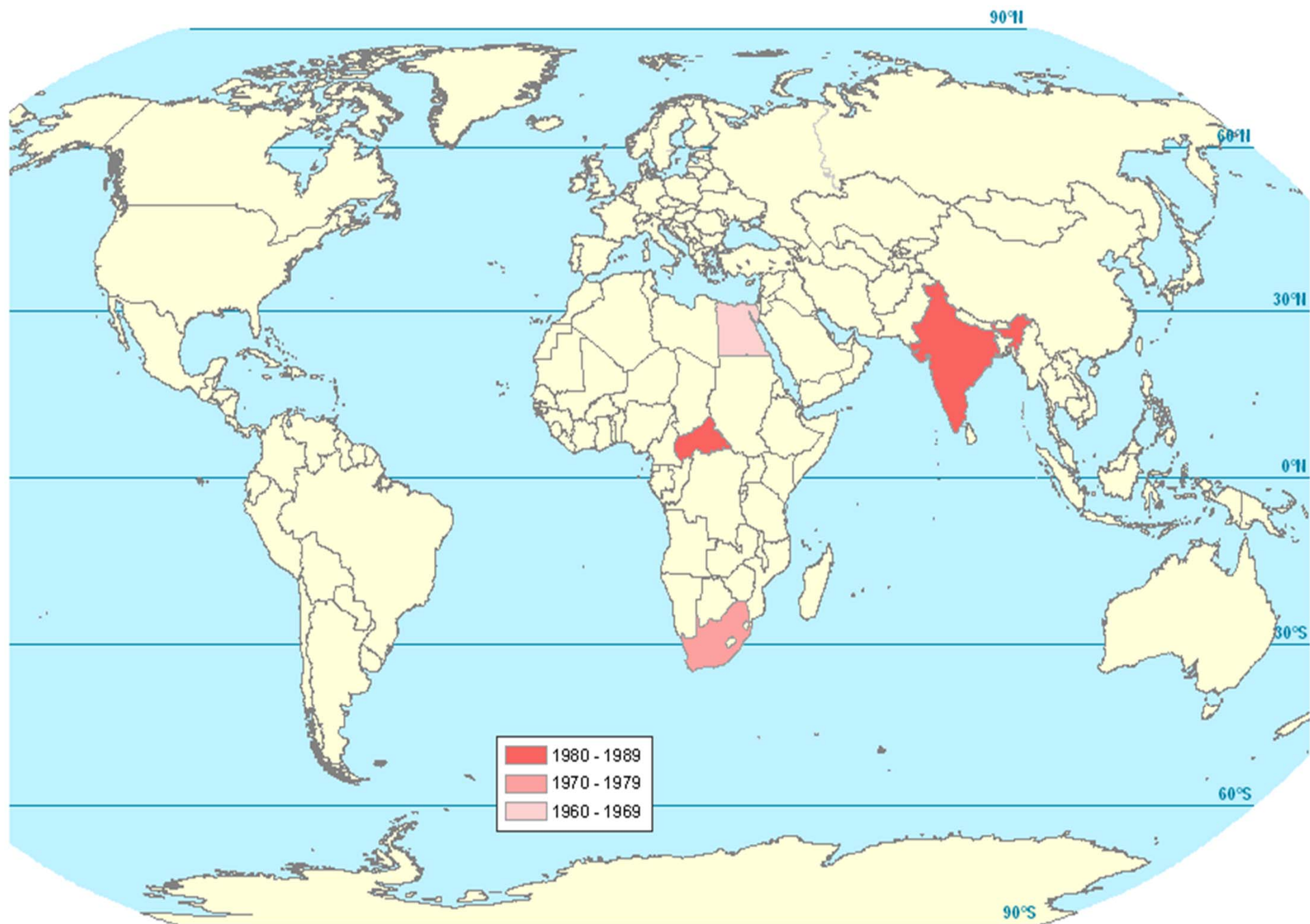
# WNV: classification



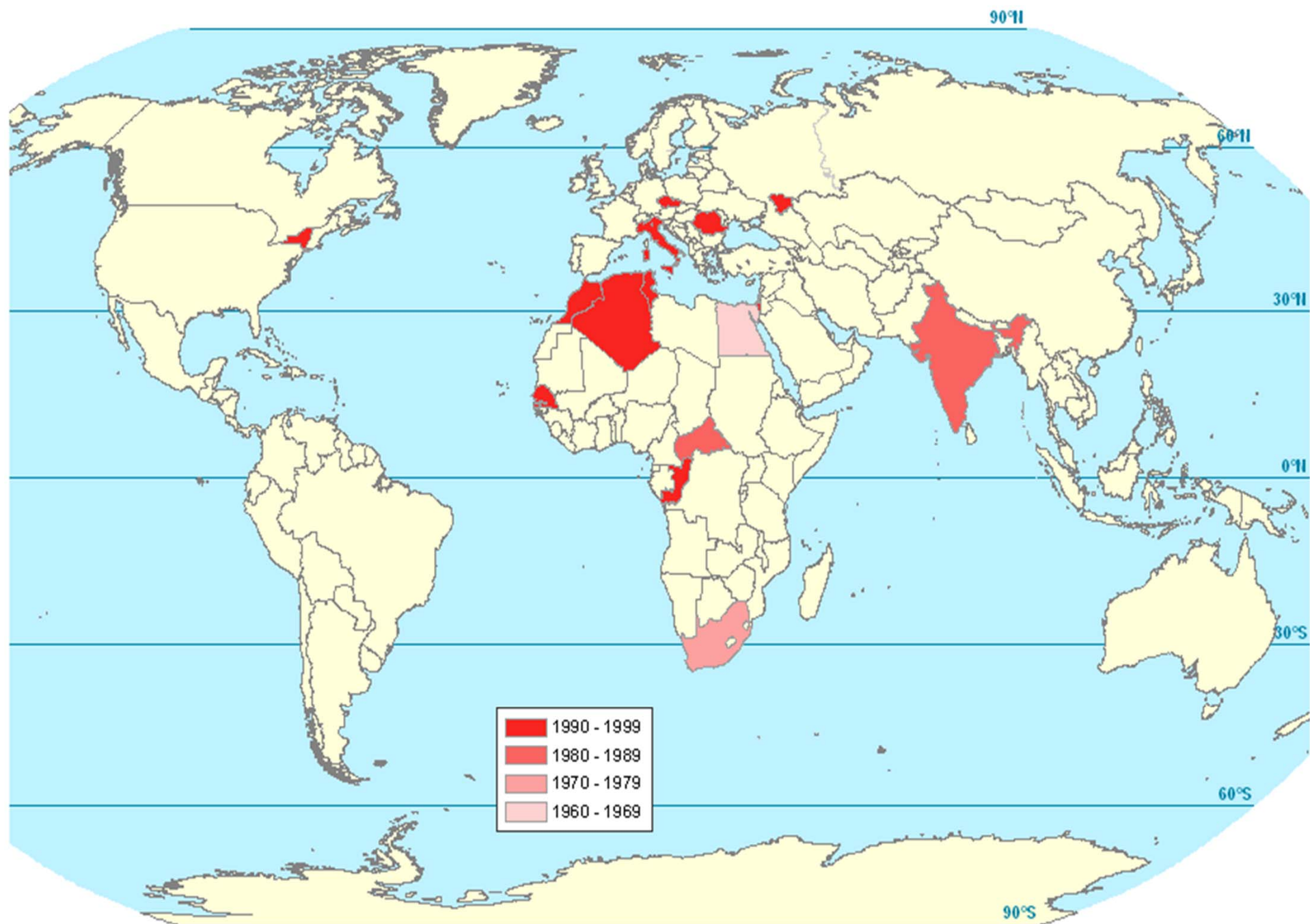
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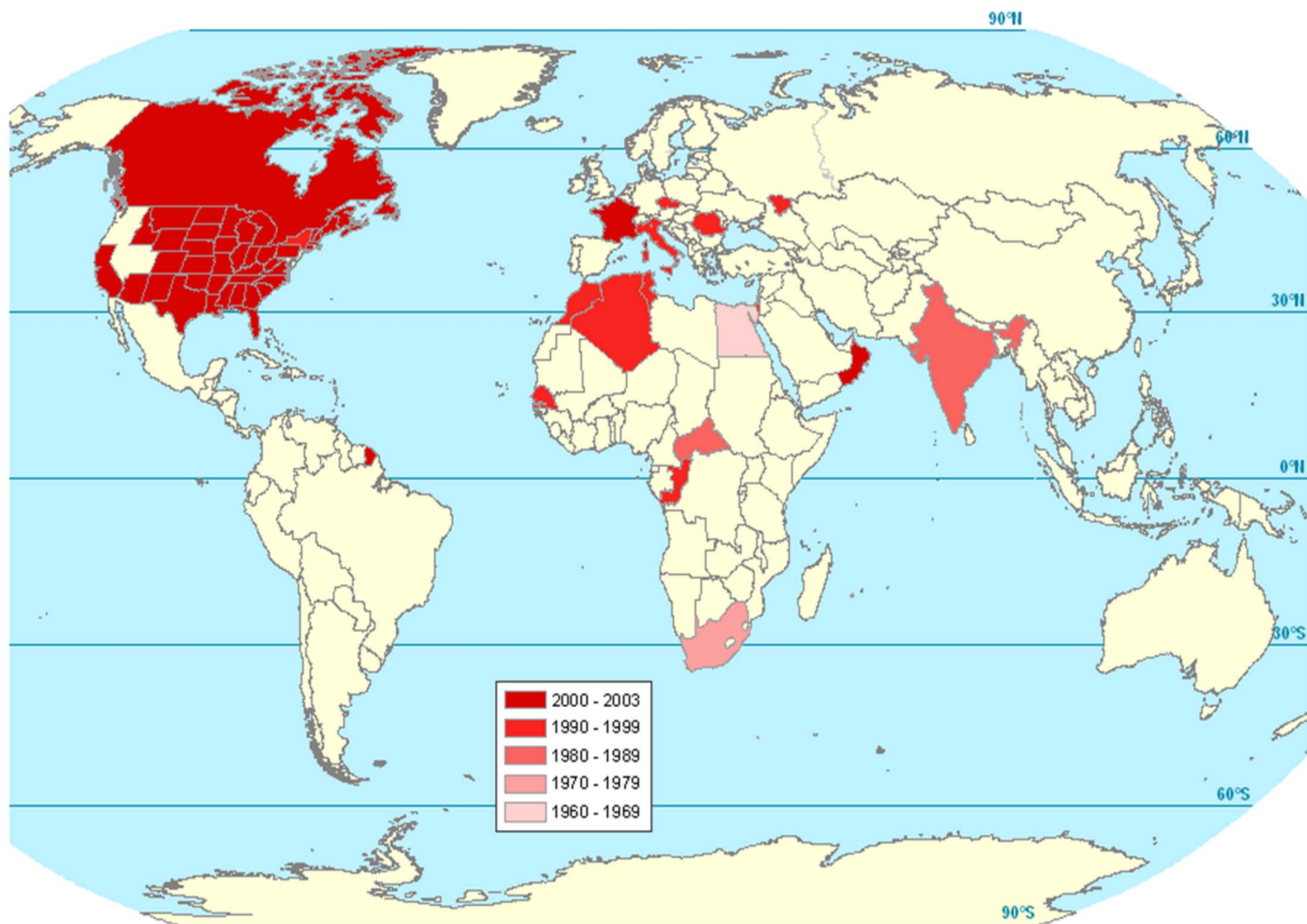
Sotelo *et al.*, 2009.

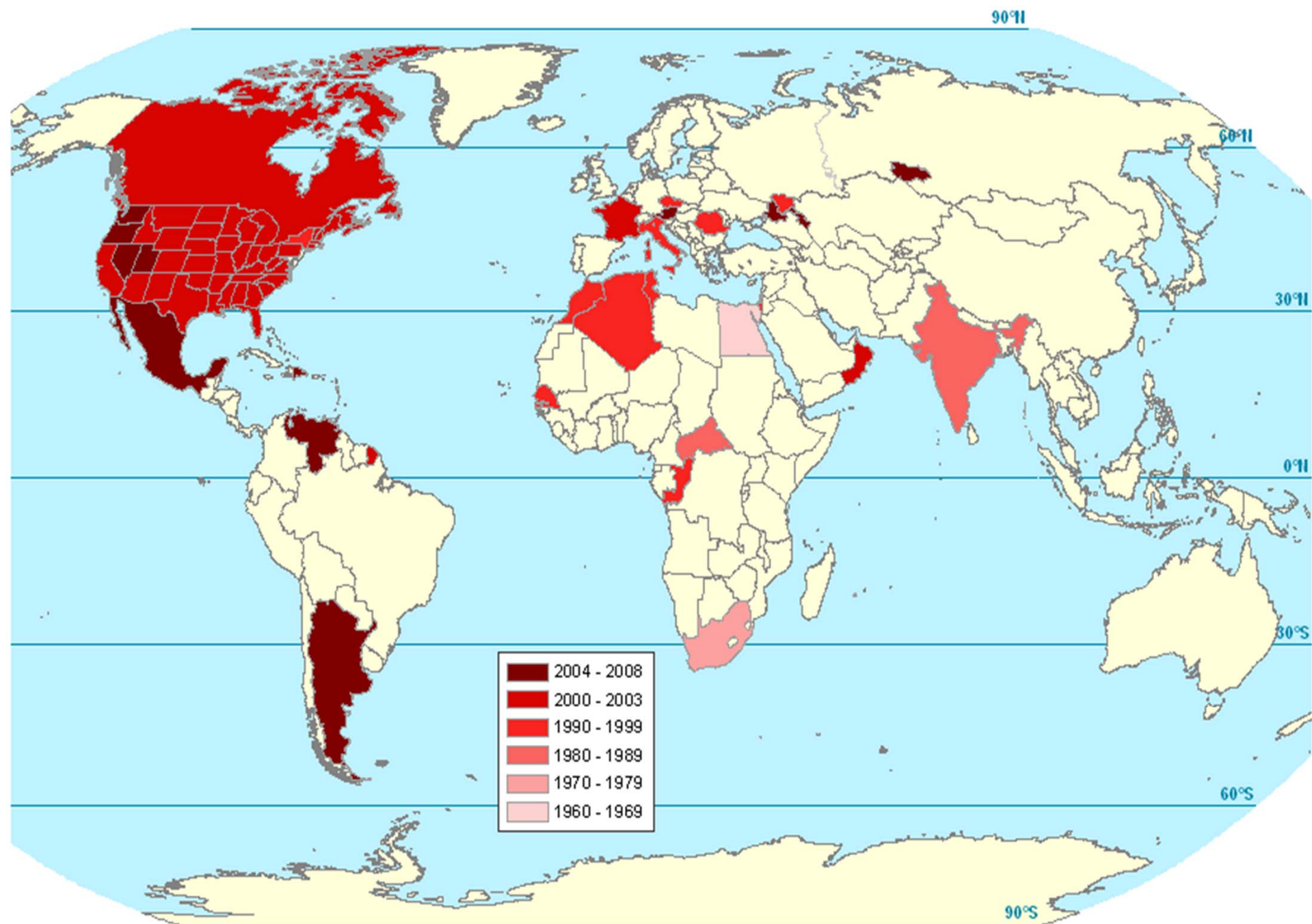




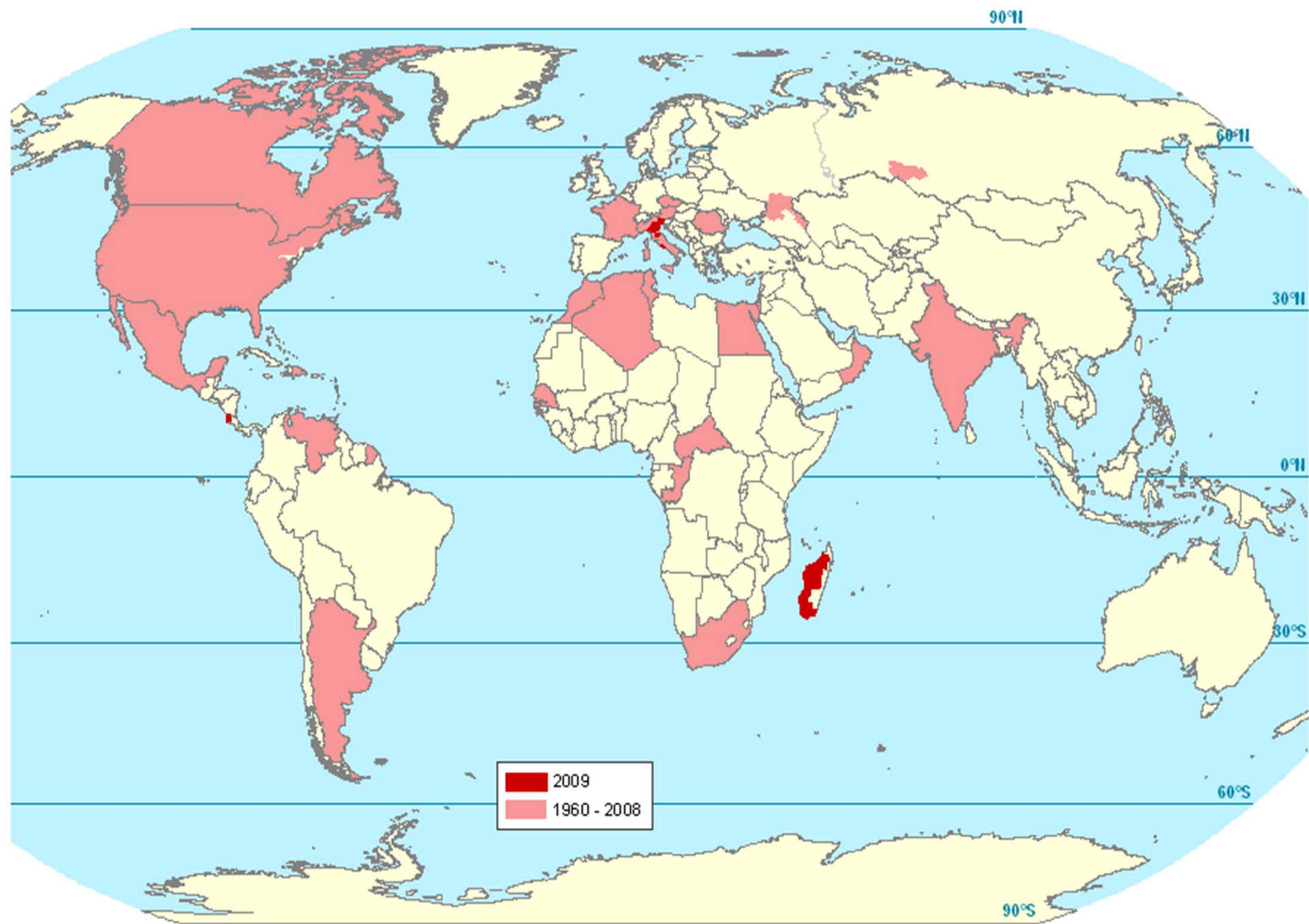




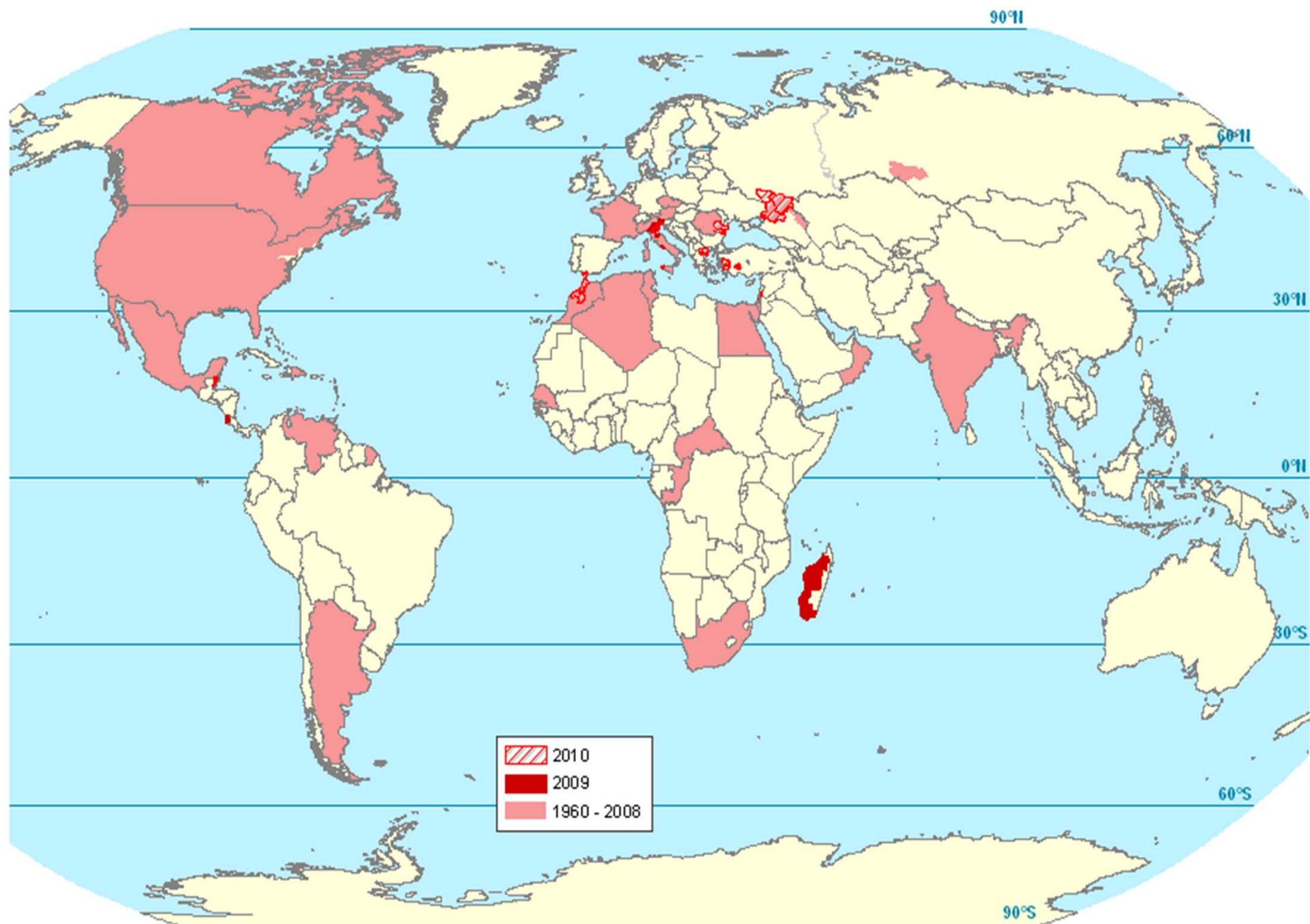




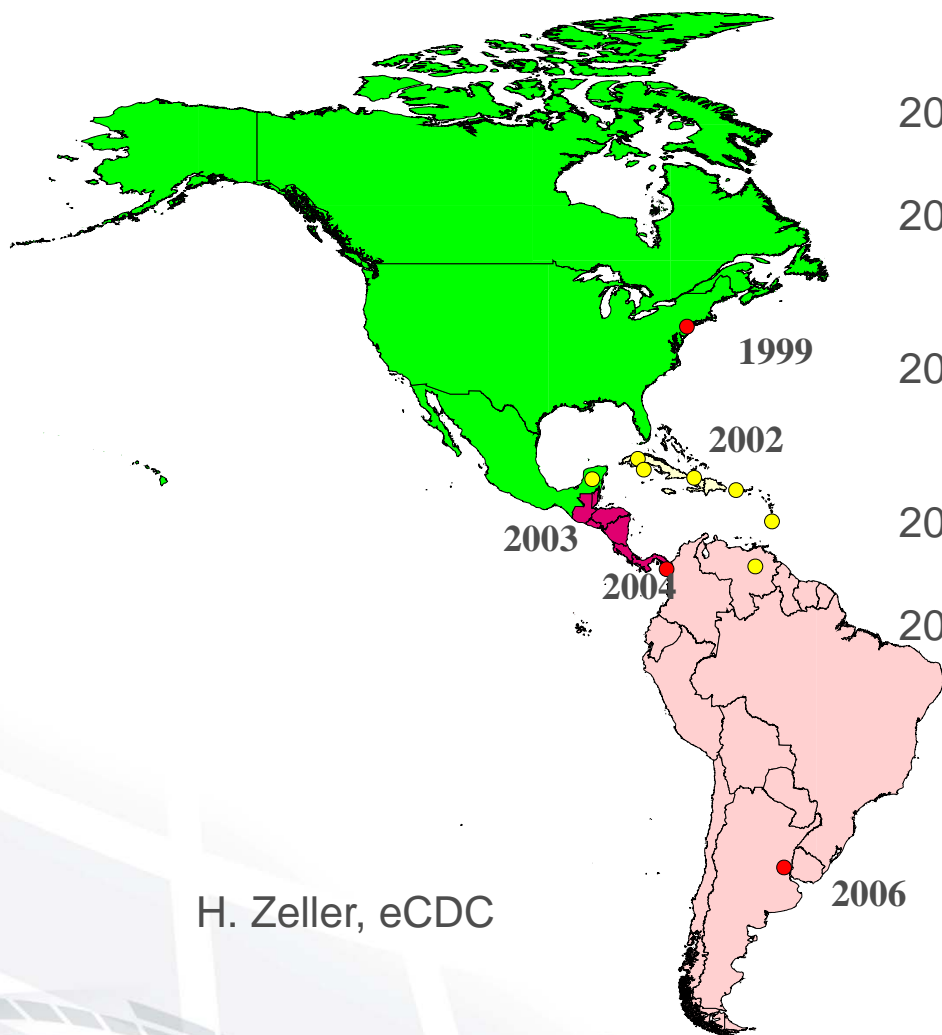








# Rapid dissemination of WNV on the american continent



2001 Cayman islands

2002 Guadeloupe, Dominican Republic,  
Jamaica

2003 Mexico, Bahamas, Puerto Rico,  
Cuba

2004 Colombia, Trinidad

2006 Argentina, Venezuela

H. Zeller, eCDC

Birds and horses cases  
Very few human cases





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# Human Neuroinvasive Disease Incidence in the United States 1999

**Incidence per  
million**



.01-9.99



10-99.99



$\geq 100$



Any WNV Activity



CDC





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# Human Neuroinvasive Disease Incidence in the United States 2000

Incidence per  
million



.01-9.99



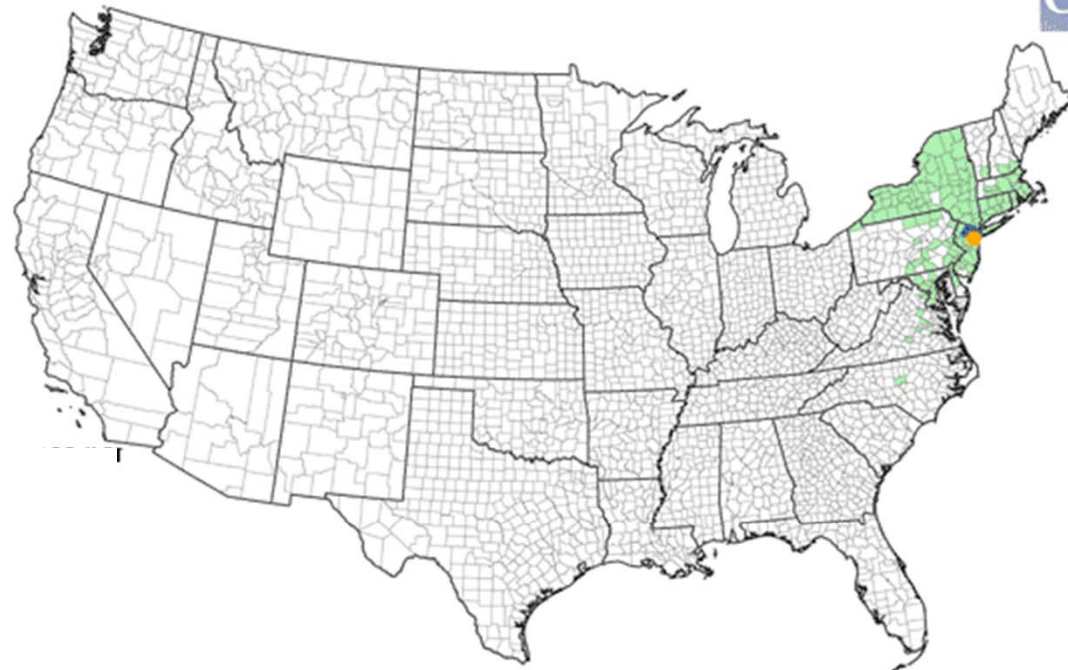
10-99.99



$\geq 100$



Any WNV Activity







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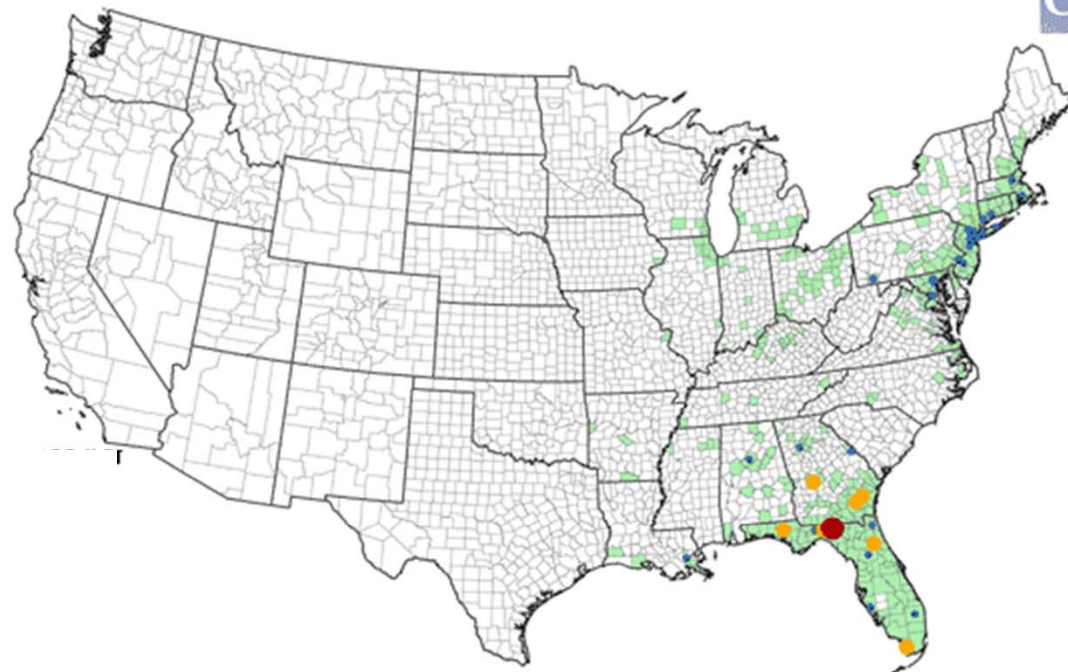
10-99.99



$\geq 100$



Any WNV Activity



CDC

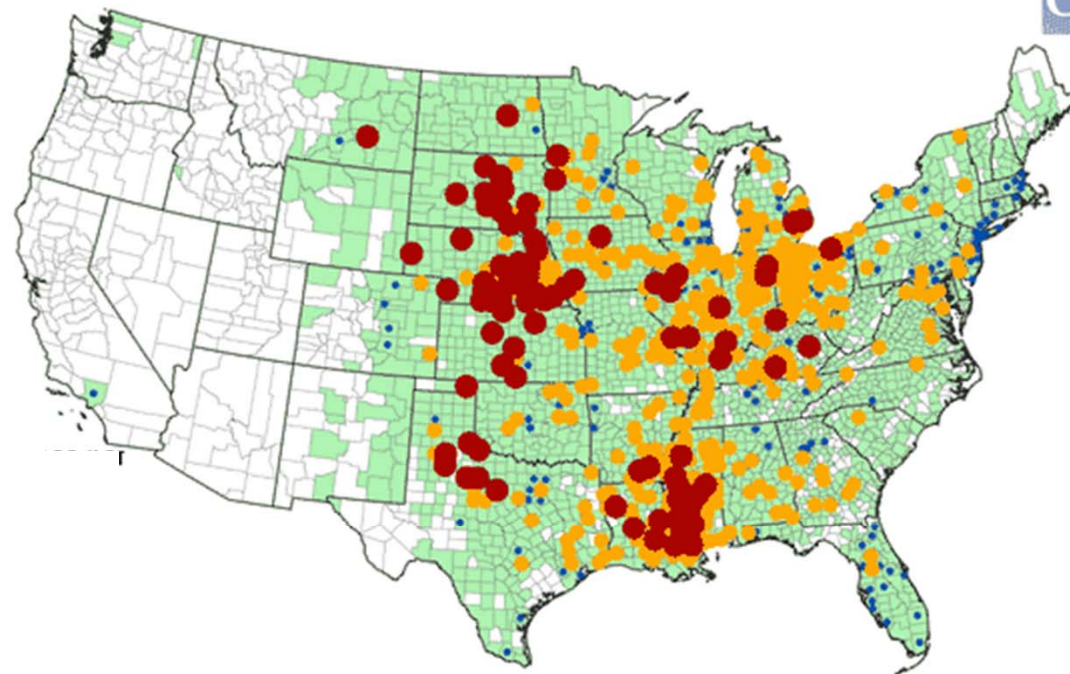




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# Human Neuroinvasive Disease Incidence in the United States 2002

Incidence per  
million

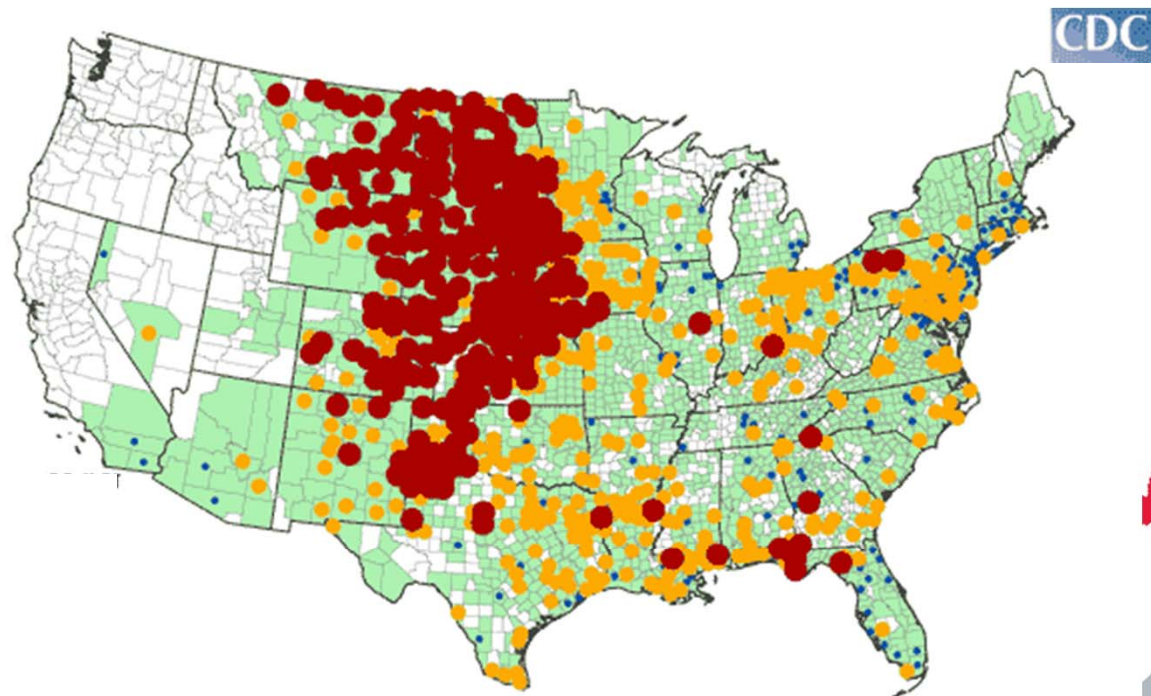




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# Human Neuroinvasive Disease Incidence in the United States 2003

Incidence per  
million



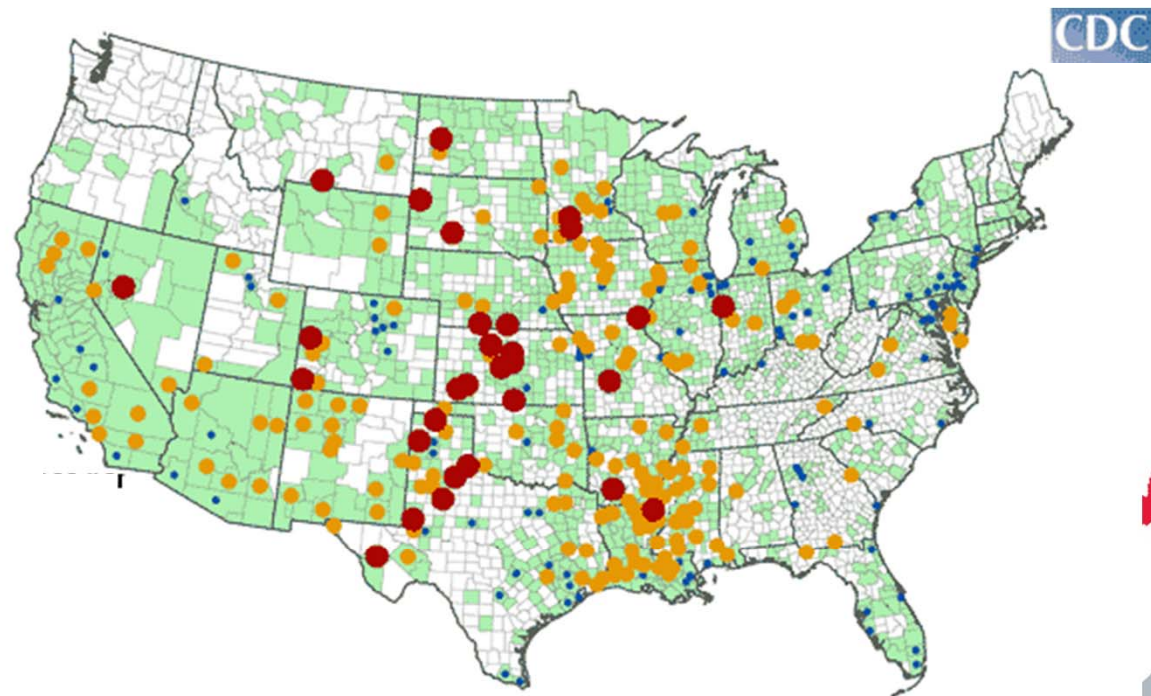




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# Human Neuroinvasive Disease Incidence in the United States 2004

Incidence per  
million







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# Human Neuroinvasive Disease Incidence in the United States 2005

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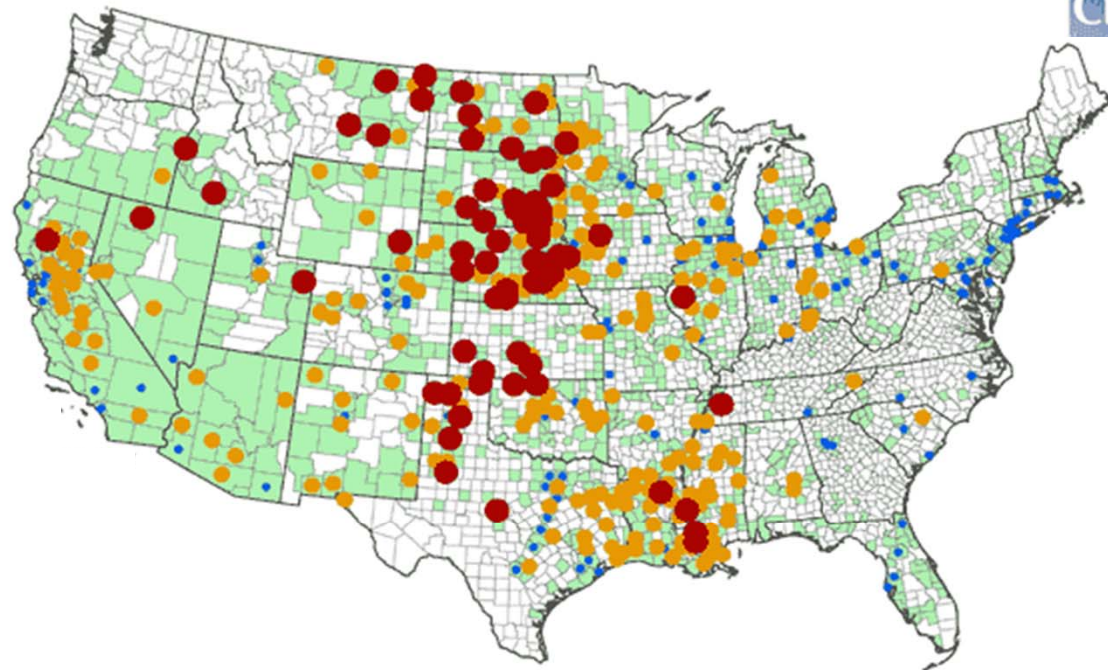
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Any WNV Activity



CDC

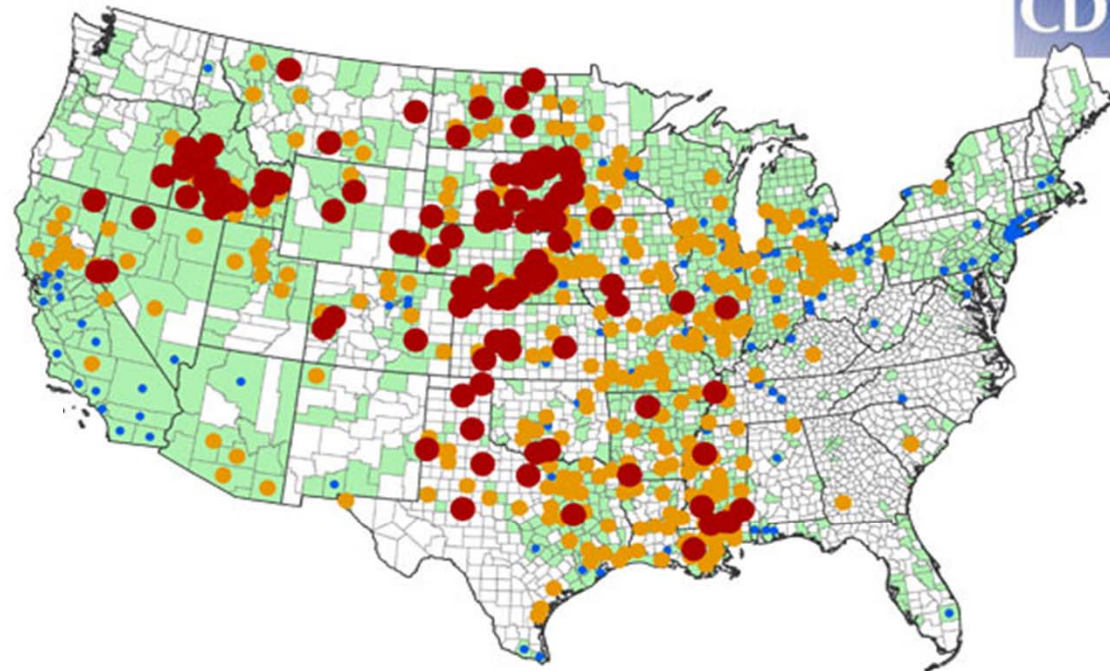




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# Human Neuroinvasive Disease Incidence in the United States 2006

Incidence per  
million

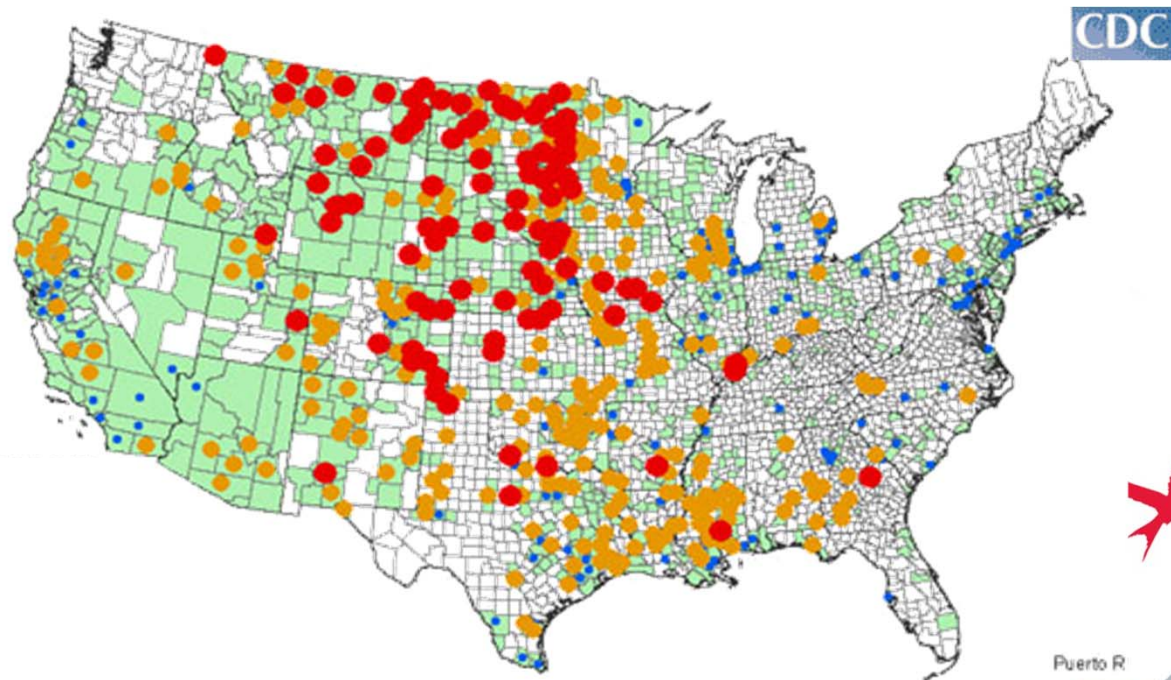




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# Human Neuroinvasive Disease Incidence in the United States 2007

Incidence per  
million







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# Human Neuroinvasive Disease Incidence in the United States 2008

Incidence per  
million



.01-9.99



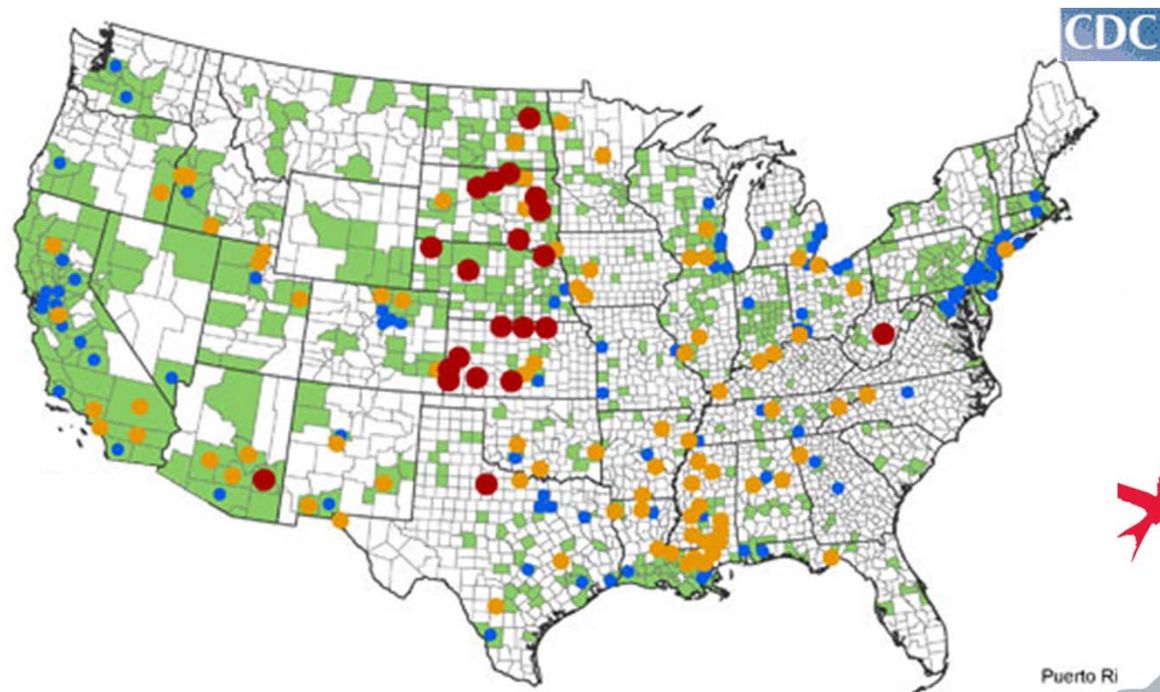
10-99.99



$\geq 100$



Any WNV Activity



Puerto Ri





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# Human Neuroinvasive Disease Incidence in the United States 2009

**Incidence per  
million**



.01-9.99



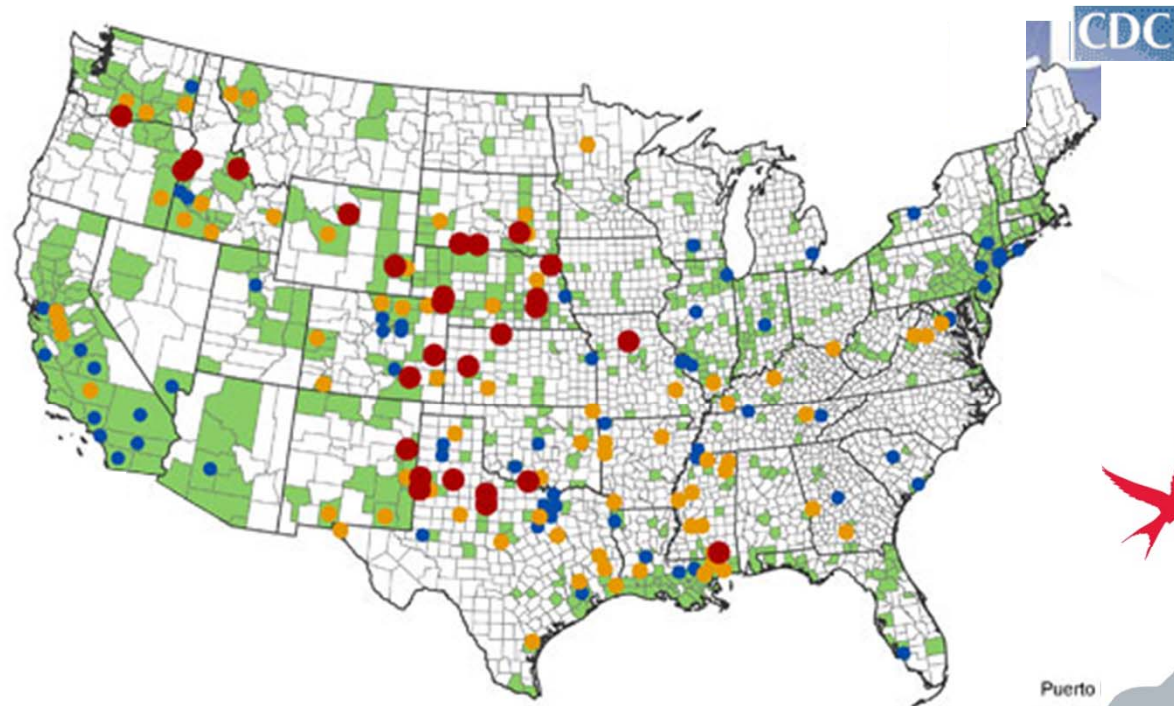
10-99.99



$\geq 100$



Any WNV Activity

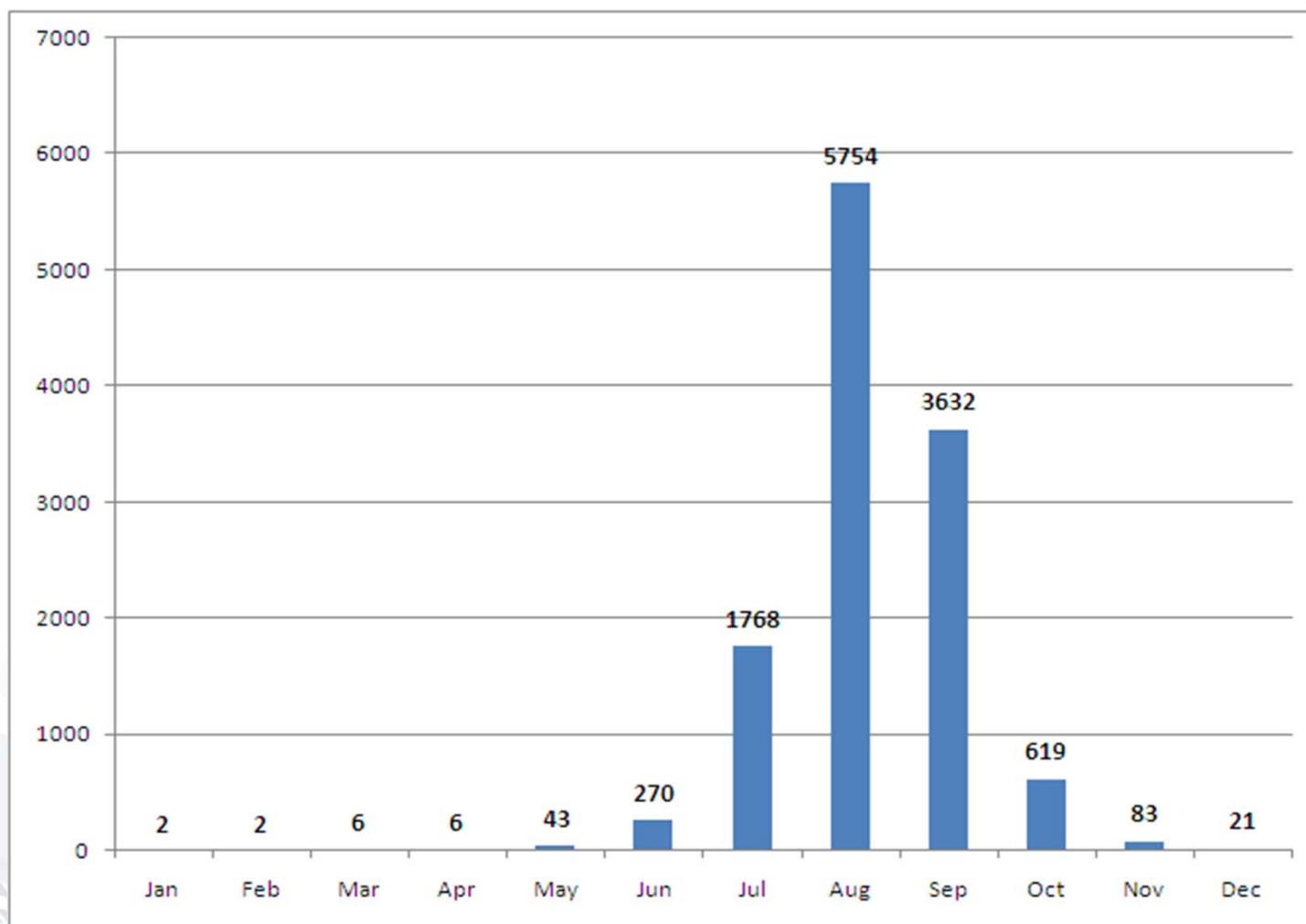


Puerto





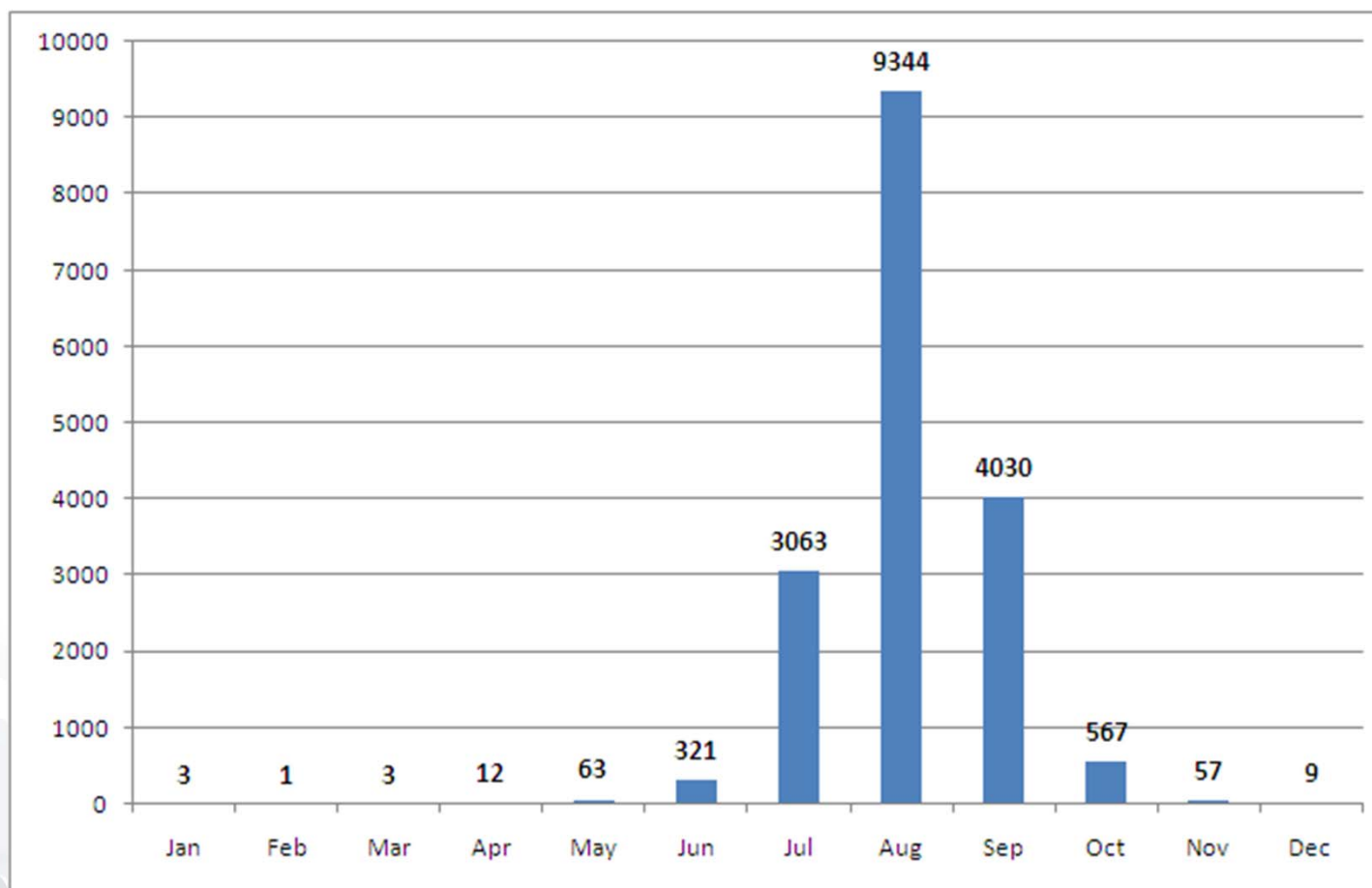
# Number of Human Neuroinvasive Cases 1999-2009





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# Number of Human Non-Neuroinvasive Cases 1999-2009







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# Human Neuroinvasive Disease Incidence in the United States 2010

West Nile virus (WNV) neuroinvasive disease incidence  
reported to ArboNET, by county, United States, 2010  
*as of December 28, 2010*



Per 100,000 Population\*



\*Scales are different for state and county incidence maps

CDC

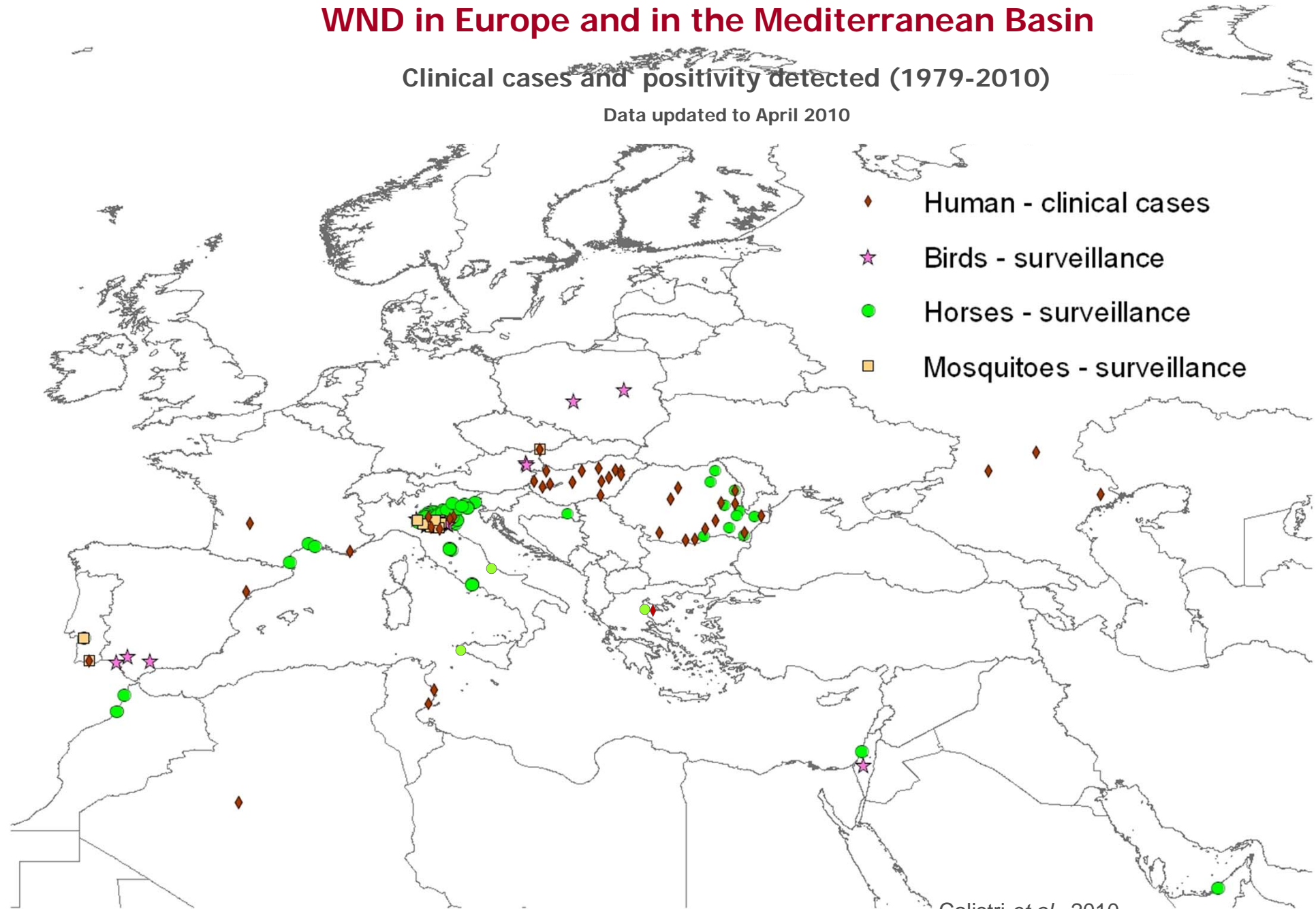




# WND in Europe and in the Mediterranean Basin

Clinical cases and positivity detected (1979-2010)

Data updated to April 2010

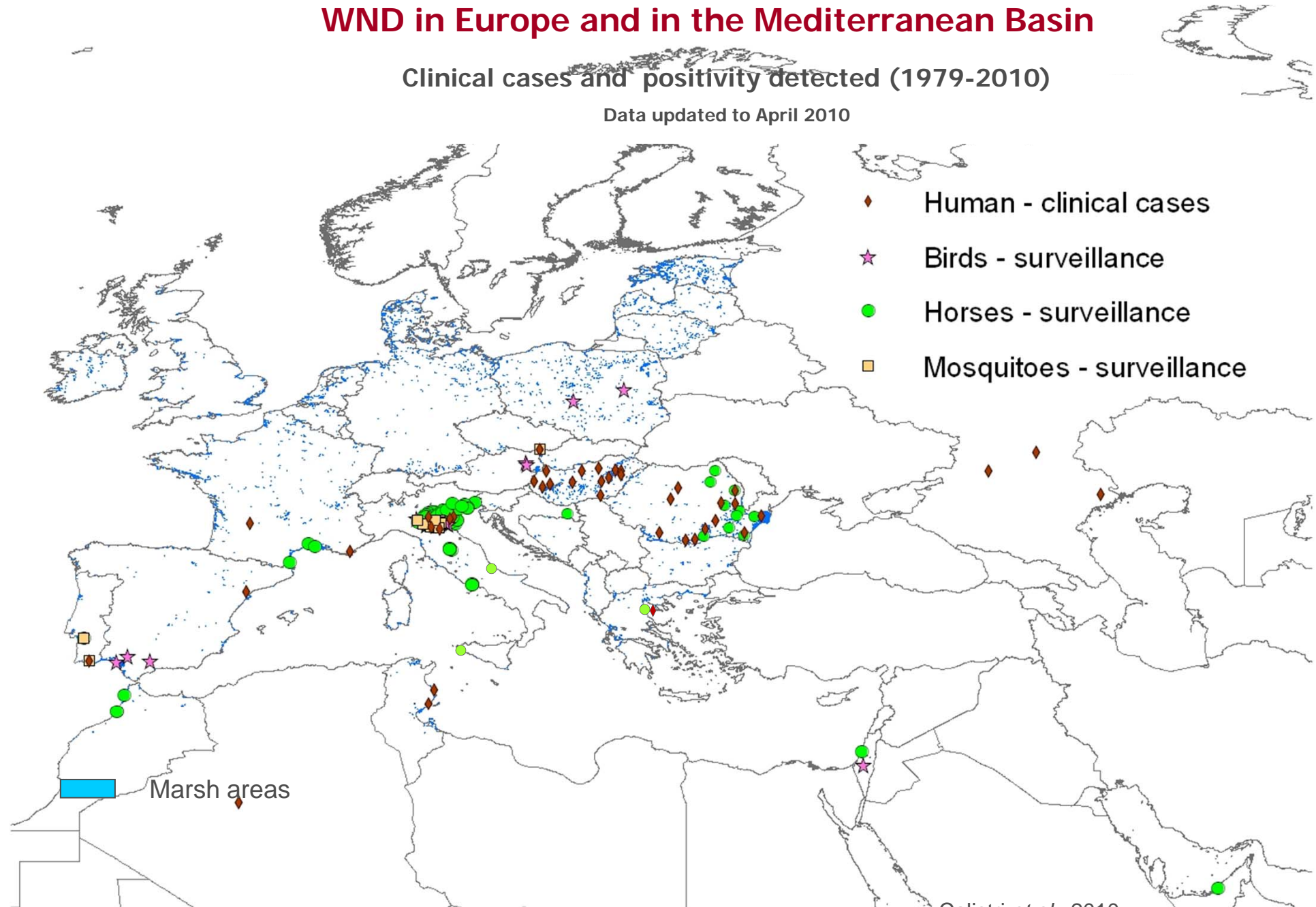


Calistri *et al.*, 2010

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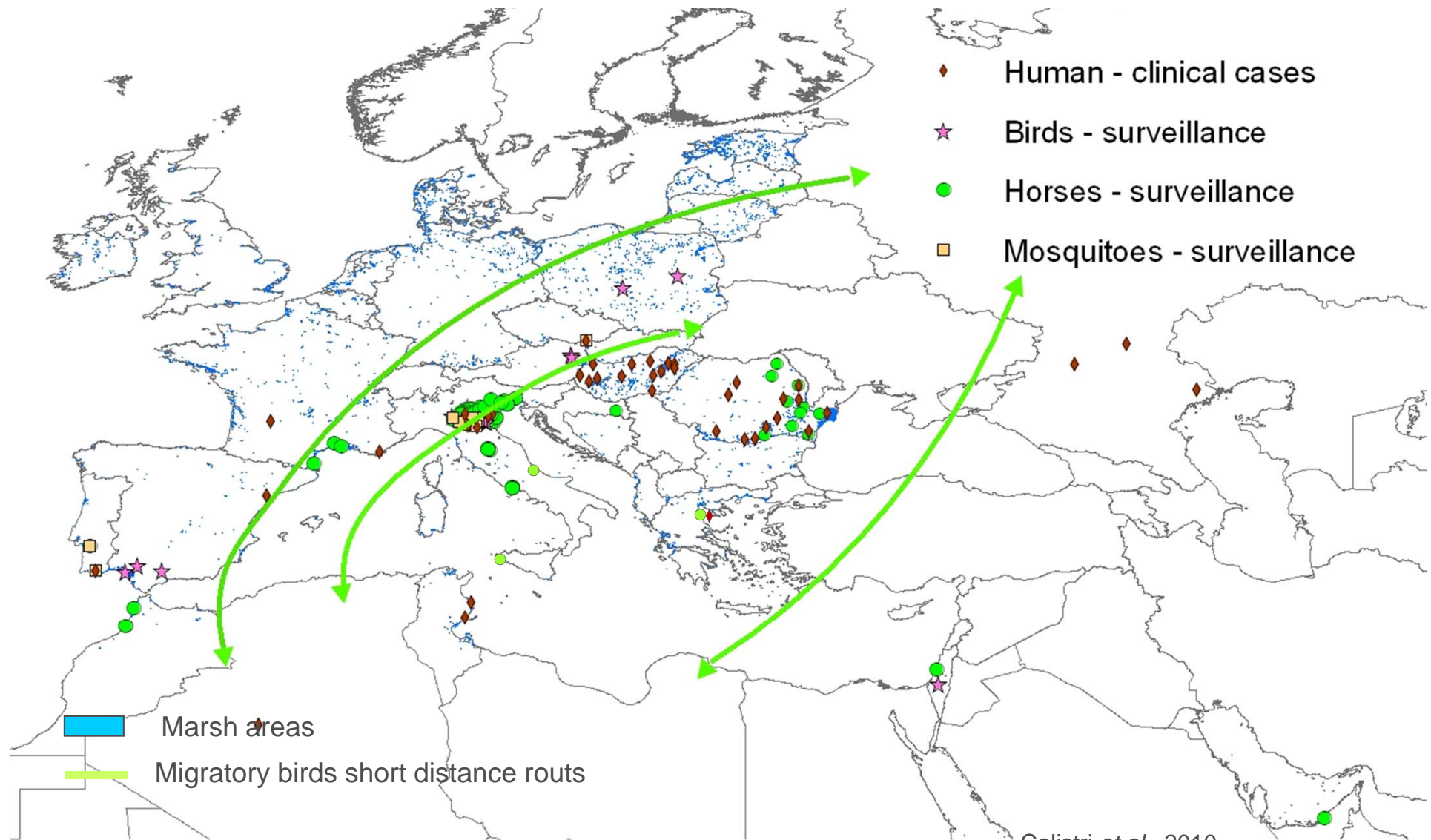


Calistri *et al.*, 2010

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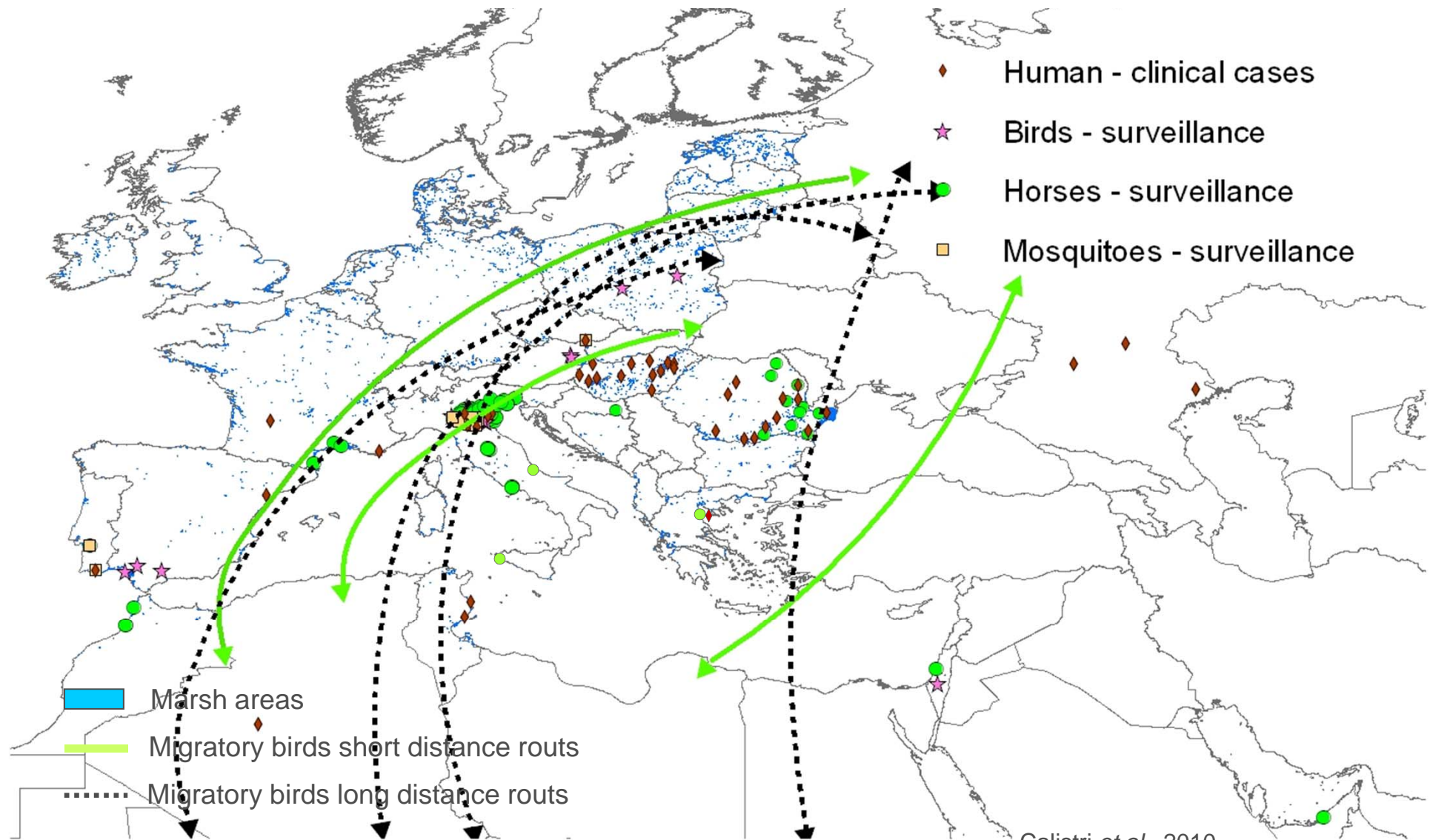
Calistri *et al.*, 2010



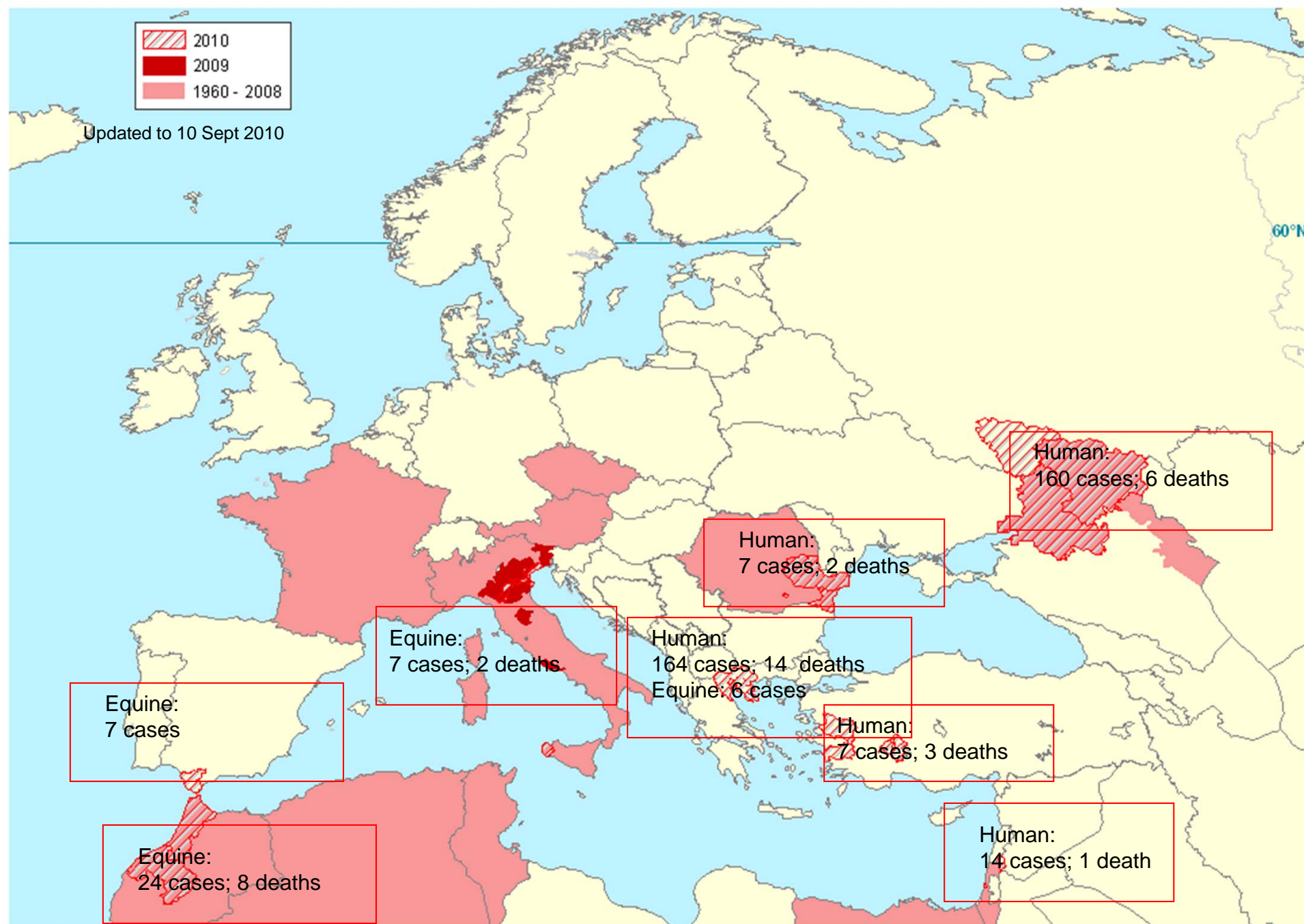
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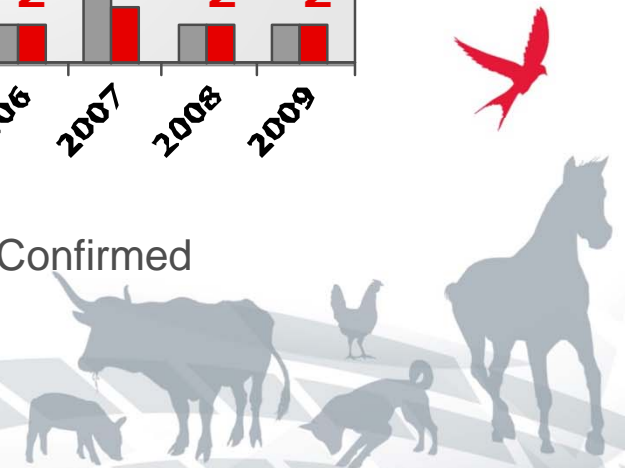
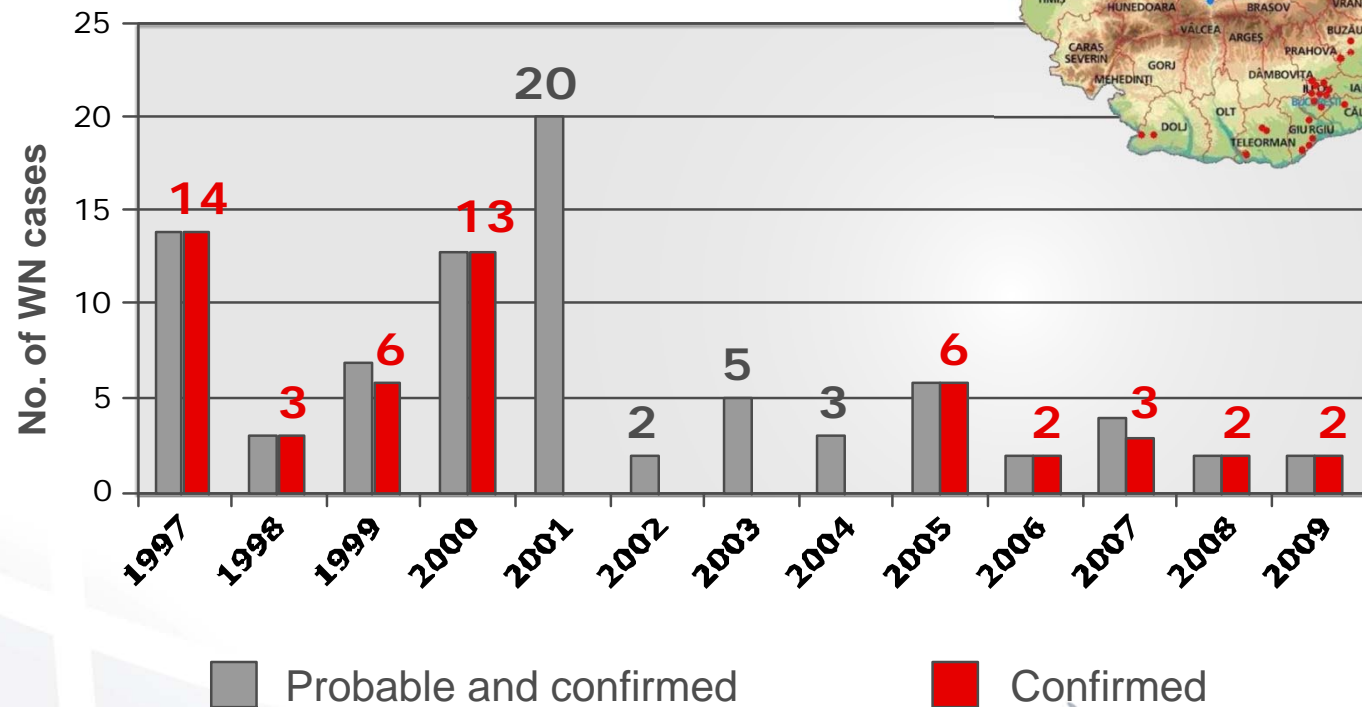
Calistri *et al.*, 2010





# Endemic circulation of WNV in Romania

## Neuroinvasive West Nile cases







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# Limited outbreaks in South France



Mediterranean  
departments

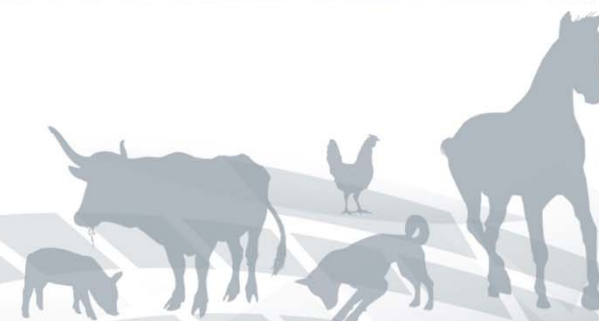
117 equine cases and 30 deaths in total  
7 human cases in 2003

Lecollinet S.



# WND in the Mediterranean Basin 2010 (1<sup>st</sup> July 2010 – 3<sup>rd</sup> January 2011)

Country	Species	No. Cases	No. Deaths
Bulgaria	Equidi	8	0
Greece	Uomo	261	34
	Equidi	30	3
Israel	Uomo	24	1
Italy	Uomo	3	0
	Equidi	128	5
Morocco	Equidi	25	8
Portugal	Equidi	1	1
Romania	Uomo	41	4
	Equidi	6	0
Russia	Uomo	480	6
Spain	Equidi	41	10
Turkey	Uomo	7	3
Hungary	Uomo	3	0
<b>Total</b>		<b>1058</b>	<b>75</b>



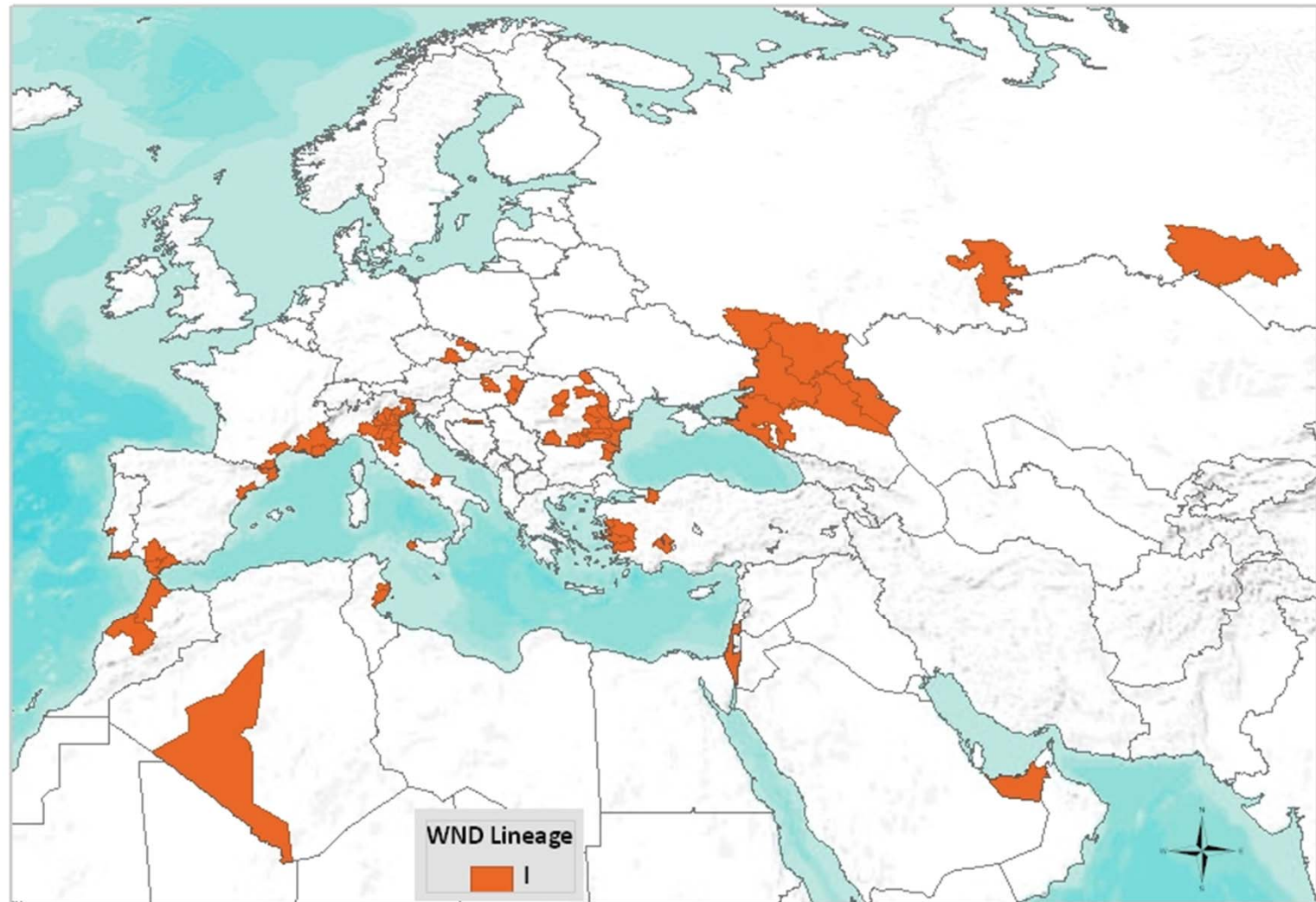




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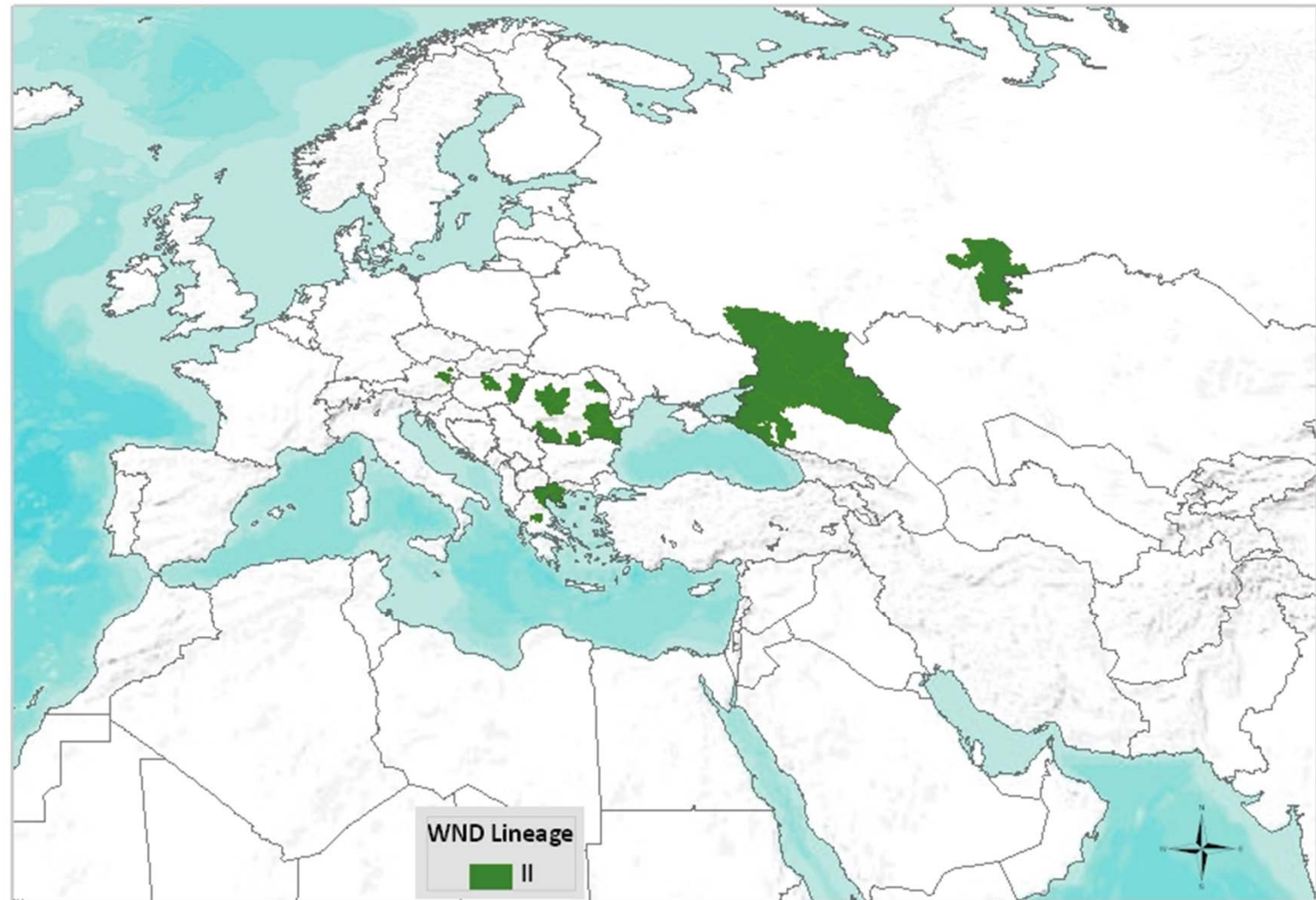
# Lineage I distribution in Europe and Mediterranean Basin





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# Lineage II distribution in Europe and Mediterranean Basin





# Thank you

