EVIDENCE OF PERSISTANT ACTIVITY OF WEST NILE VIRUS IN THE PO PLAIN AREA OF ITALY

Romeo Bellini, Alessandro Albieri, Rodolfo Veronesi

Centro Agricoltura Ambiente "G.NICOLI", Medical & Veterinary Entomology Dept., Via Argini Nord 3351, 40014 Crevalcore (BO), Italy www.caa.it/entomology

P.Bonilauri, M.Calzolari. M.Dottori, M.Tamba - Istituto Zooprofilattico Sperimentale della Lomabardia e dell'Emilia-Romagna, Brescia, Italy

P.Angelini - Emilia-Romagna Region Public Health Service, Bologna, Italy

L.Venturi - AUSL Ravenna, Public Health Service, Ravenna, Italy

C.Venturelli - AUSL Cesena, Urban and Health Entomology Dept., Cesena, Italy

Introduction

In the Mediterranean basin, West Nile virus (WNV) causes sporadic outbreaks, which usually affect a low number of humans and animals, after which long periods without virus circulation occur. An hypothesis is that the virus can remain silent, circulating in a sylvatic enzootic bird-mosquito cycle and only under appropriate conditions causing new outbreaks in humans and horses.

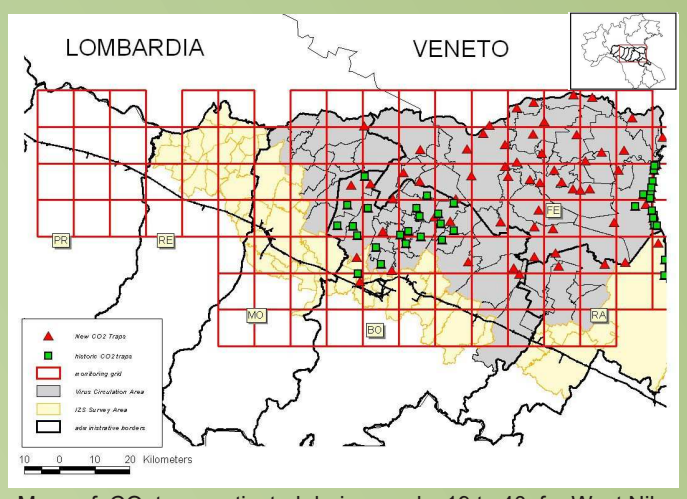
During the late summer 2008 a large epidemic of West Nile virus occurred in North-East Italy involving an area of more than 7,000 Kmsq in 3 Regions (Lombardia, Veneto, Emilia-Romagna). This was the largest epidemic ever recorded in the country. Following the first evidence in equine and birds an active entomological surveillance plan was started by the Emilia-Romagna Surveillance Group on Vectorial Disease.

Starting from the end of July 2009, WN positivity was detected in *Culex pipiens* pools, magpie (*Pica pica*), and equines in and around the WN interested area 2008.

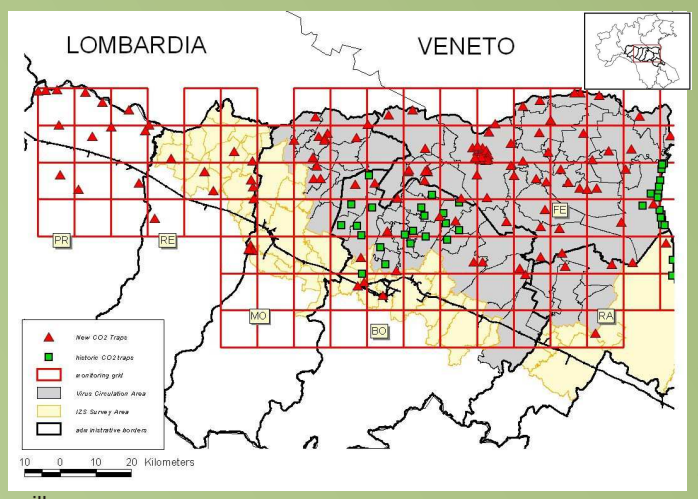
In the 2009 summer the surveillance in Emilia-Romagna region was activated focusing on mosquitoes, wild birds, equines (active and passive) and humans.

Entomological Surveillance

Season 2008



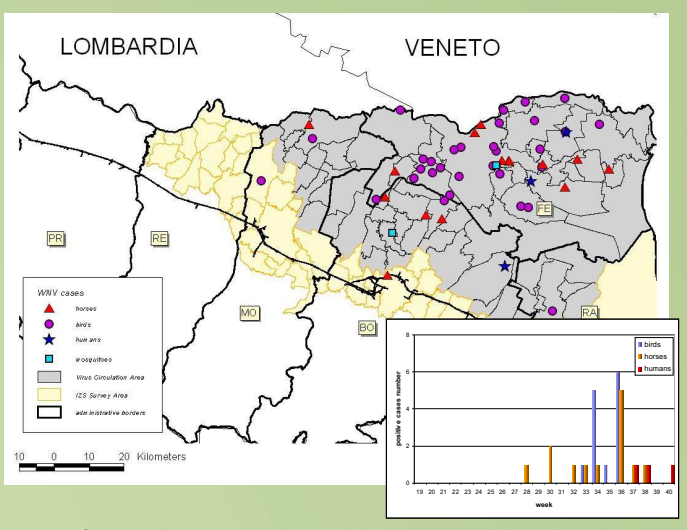
Season 2009



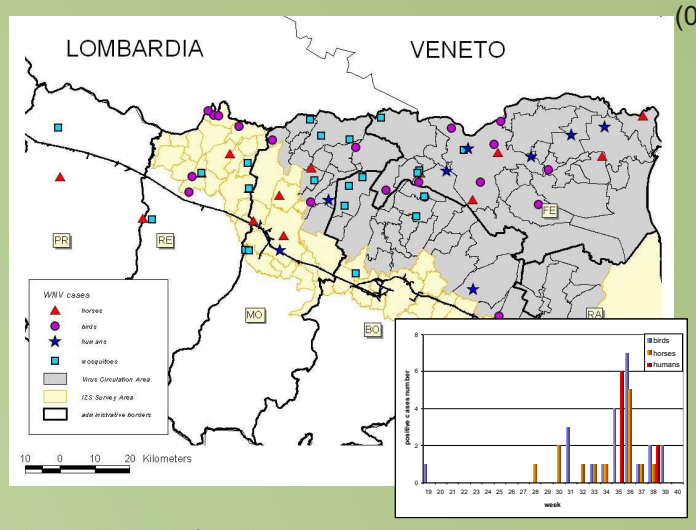
Maps of CO_2 traps activated during weeks 19 to 40 for West Nile surveillance.

Surveillance in wild birds, equines and humans

Season 2008



Season 2009



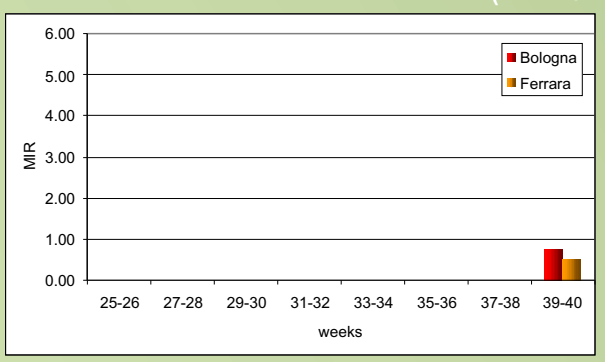
Maps of West Nile cases registered during weeks 19 to 39; on bottom-right the weekly trend of positive cases.

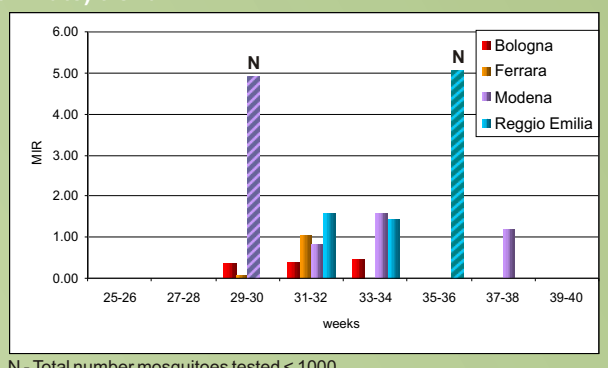
Entomological Results

Season 2008

Season 2009

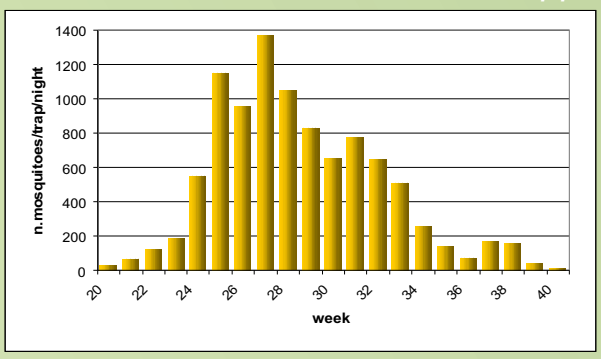
MIR (Minimum Infection Rate) trend

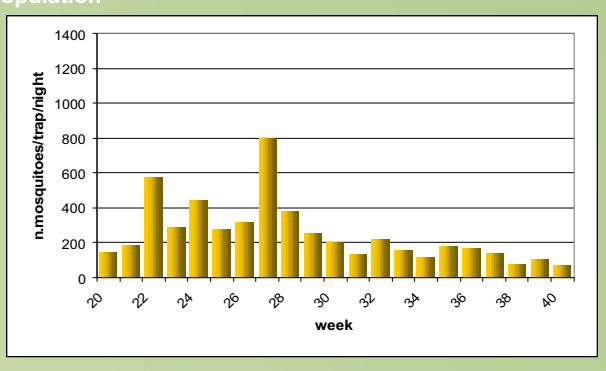




N - Total number mosquitoes tested < 1000

***Culex pipiens* trend population**





ACKNOWLEDGMENTS

We thank the Veterinary Units of the AUSL Bologna, Ferrara, Modena, Reggio Emilia and AMSFEC S.p.a. Ferrara for their support in field activities and data collection.

2008

Mosquito collection was conducted by CO_2 baited traps specifically positioned in 78 sites. Totally in the period September 3 - October 23, more than 20,000 mosquitoes of which 53% *Culex pipiens*, 43% *Aedes caspius*, 2% *Aedes albopictus*, 1% *Aedes vexans*, 0.2% *Anopheles maculipennis*, 0.02% *Culex modestus*, 0.02% *Culiseta annulata* were analysed by RT-PCR.

Two pools of *Cx.pipiens* collected at the end of September in different localities tested positive for WN virus.

2009

Surveillance in mosquitoes. Mosquito collection was conducted during weeks 25-42 by CO_2 traps in 75 fixed stations with weekly to monthly periodicity.

To date (September 30) more than 163,000 mosquitoes were collected and pooled (≤ 200 individuals/pool) of which *Cx. pipiens* confirms to be the most abundant species (87.14%) followed by *Ae.caspius* (10.90%), *Ae.vexans* (1.22%), *Ae.albopictus* (0.55%), *Cx.modestus* (0.13%), *An.maculipennis* (0.03%), *Ae.dorsalis* (0.007%), *Ae. detritus* (0.003%).

Total mosquito captured by CO_2 traps and pools analyzed (September 30)

species	muquitoes number	pools number
Ae.albopictus	907	80
Ae.caspius	17,800	207
Ae.detritus	5	2
Ae.dorsalis	13	1
Ae.geniculatus	7	2
Ae.vexans	1,988	36
An.maculipennis s.l.	50	12
An.plumbeus	1	1
Cx.modestus	210	23
Cx.pipiens	142,174	1,065
TOTAL	**163,155**	**1,429**

Surveillance in wild birds. 29 wild birds were found infected in four provinces: 22 magpies (*Pica pica*), 4 carrion crow (*Corvus cornix*), 2 common starling (*Sturnus vulgaris*), 1 eurasian jay (*Garrulus glandarius*).

Surveillance in equine. So far, 18 symptomatic horses have been confirmed by PCR, in 16 localities. The vaccination started in 2009 progressively covering the equine population, thus making this activities more complex.

Surveillance in humans. A total of 8 cases with a neurological syndrome were confirmed by PCR (with one death in 2009). The average age of patients resulted 70 years (min 62, max 78). In 2008 3 human cases were registered.

Conclusions

- The persistence of WN activity in the Po plain for two consecutive years indicates that the area is becoming suitable for WN establishment and possible endemicity, stressing the need to organize standard surveillance measures aimed to the early detection of WN activity and risk evaluation in public health.
- *Cx.pipiens,* the most abundant mosquito species in the region, is confirmed as the main vector species, no other species resulted infected in the field.
- It is confirmed that CO_2 trap is a valuable tool for entomological surveillance.
- Compared to 2008, the *Cx.pipiens* population density, as shown by CO_2 traps, resulted decreased an average of 46% in 2009.
- When considering mosquito samples higher than 1000 individuals, the highest MIR values resulted in the provinces of Modena and Ferrara during weeks 31 to 34 and were in the range from 1.02 to 1.59.