WEST NILE VIRUS ACTIVE SURVEILLANCE PROGRAM IN HORSES IN CATALONIA (2020)

Faculty of Veterinary Medicine

Llibertat Puigarnau Pino

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Universitat Autònoma de Barcelona

INTRODUCTION

West Nile Fever (WNF) is an infectious zoonotic disease of viral etiology, concretely, West Nile Virus (WNV), a flavivirus belonging to the Japanese Encephalitis virus serocomplex(JEV).

WNV has got a biological enzootic transmission cycle maintained between mosquitoes and birds, whereas its dead-end hosts are equine and human, being capable of causing severe neurological clinical signs and, in some cases, even death. The main way of transmission is through the bite of infected mosquitoes, mainly of genus *Culex*. These mosquitoes are ornitophilic and when they bite a person or a horse (dead-end hosts), there isn't an effective viremia to therefore transmit the virus.

Objectives

Early detection of West Nile Virus circulation in sentinel animal hosts and arthropod vectors all around Catalonia, focusing in influence areas of West Nile Fever.

Prevention of the disease in human, birds and horses (sentinel animals) because of the potential risk of this condition in terms of Public Health and Animal Health.

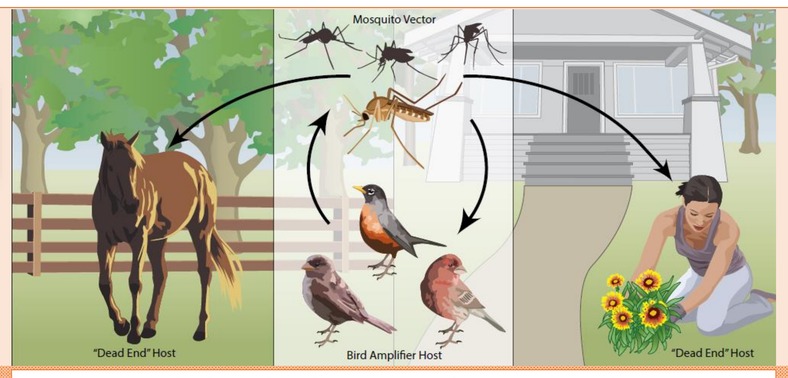

Figure 1: WNV biological cycle. Courtesy of: CDC(Centers for Disease Control and Prevention)

MATERIAL AND METHODS

1.Conditions of sampling: study population of **WNV active surveillance program** consisted in equine living in Catalonia between December 2019 and November 2020, non vaccinated in front WNF and without clinical signs compatible with the disease**.** This sampling allowed detection of WNF in 5% of the population with a 95% of confidence. Samples were obtained in the Hospital Clínic Veterinari de la UAB and by field sampling in areas of higher risk of WNF. Field sampling consisted in obtaining of serum samples from 4 horses per farm and 4 horses per county.

2.Obtaining and sample submitting: 5 ml of equine serum without anticoagulant maintained at 4ºC.

3.Laboratorial diagnostic:

- **IRTA-CReSA: analysis of samples** by **competitive ELISA** against **flavivirus**(IgM and IgG)**, analysis of positive samples for its confirmation by capture ELISA**(IgM).
- **LCV of Algete:** confirmation of positive samples at competitive ELISA by **serum neutralization test** against WNV(IgG).

4. Descriptive analysis of data: descriptive statistics (percentages or proportions) using Excel 2019 (UAB Office 365) and statistical inference.

RESULTS AND DISCUSSION

Between December 2019 and November 2020, 268 horses were sampled in the framework of West Nile Virus Active Surveillance program in horses in Catalonia. Positive results of competition ELISA and the results obtained in capture ELISA are shown in Table 1.

Table 1: Positive results of samples tested with competition ELISA and capture ELISA results by province of origin of the samples.

	Competition ELISA positive horses (IgM and IgG)	Capture ELISA results (IgM)
Girona	1	All negative
Barcelona	12	All negative
Tarragona	15	3 positive
Lleida	15	1 positive

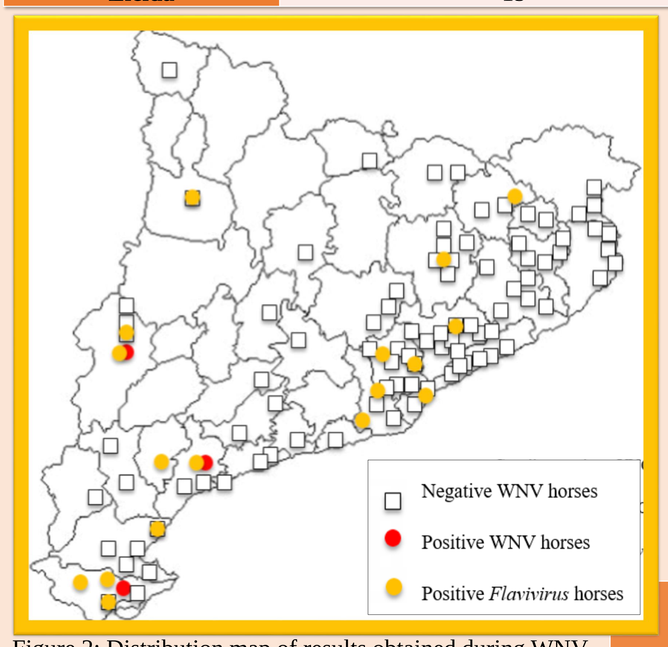

Figure 2: Distribution map of results obtained during WNV active surveillance program on equine (2020)

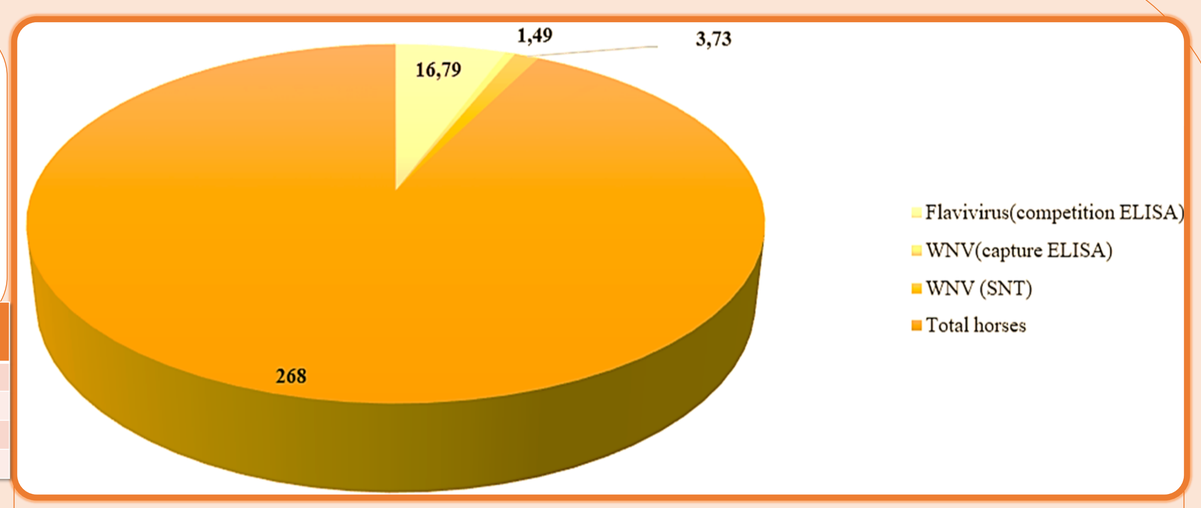

Figure 3:Graph of positive results to Flavivirus and WNVobtained in competition ELISA, capture ELISA, and SNT in relation to total of sampled horses in Catalonia(n=268)

Positive competitive ELISA in front of Flavivirus

- 45 horses (45/268= 16,79%)→ 17% of horses presented antibodies against Flavivirus of Japanese Encephalitis serocomplex.

Positive capture ELISA against IgM of WNV

- 4 horses of these 45 were positive to IgM against WNV (4/45), meaning the 8,8% of positive horses to Flavivirus and the 1,49% from the total (4/268).

Distribution map (**spatial surveillance)** is shown in Figure 2:

Ω 30 catalan counties were sampled.

Positive competitive ELISA in front of Flavivirus

- Results obtained in competition ELISA have shown circulation of other Flavivirus in Catalonia during 2020, especially in la Garrotxa, el Barcelonès, el Vallès Occidental, el Vallès Oriental, el Montsià, el Baix Ebre, el Pallars Jussà, el Tarragonès, el Segrià, el Baix Llobregat i el Baix Camp.

Positive capture ELISA against IgM of WNV

- Positive results against IgM observed in equine from Montsià (2 cases in Amposta), el Segrià(1 case in Lleida) and el Baix Camp (1 case in Riudoms). Those results showed a recent circulation of WNV in that areas.

CONCLUSIONS

During 2020 **West Nile Virus circulation** and other **Flavivirus**(from Japanese Encephalitis serocomplex) have been present in horses in Catalonia. Detection has been **heterogeneous**, **stational and localized**(high sampling pressure). So, taking into account the efficacy of the WNV surveillance program preventing this zoonosis (horses=good sentinels), it will be strongly recommended to continue this program the upcoming years and to improve diagnostic techniques.