

**Clinical incidence and people's awareness of rabies in North West Ethiopia**

*Jemberu, W.T.<sup>1</sup>, Molla, W.<sup>2</sup>, Almaw, G.<sup>2</sup>, Hogeveen, H.<sup>1</sup> and Mourits, M.<sup>1</sup>, <sup>1</sup>Wageningen UR, Business economics, Netherlands, <sup>2</sup>University of Gondar, FVM, Ethiopia; [wudu.jemberu@wur.nl](mailto:wudu.jemberu@wur.nl)*

A survey was conducted to determine the incidence of rabies in humans and domestic animals, and to assess the people's awareness about the disease in north Gondar zone, North West Ethiopia. The incidence of rabies in humans and domestic animals was followed for one year from April 2009 to March 2010 based on clinical manifestation of the disease. A questionnaire was also administered to 120 residents and 5 traditional healers to assess the knowledge and practices associated with the disease in the study area. Annual rabies incidence of 23.33/million in humans, 4,128/million in dogs, 198.86/ million in cattle, 676.79/million in equines, and 144.49/million in goats was recorded. Dogs were found to be the major reservoir of the disease. Almost all community members were familiar with the disease. But serious misconception and lack of awareness about the disease's causes and means of transmissions were observed. The majority (82%) of the people attend traditional healers when they feel exposed to the disease and in some cases (16%), the traditional treatment was preceded by diagnosis. It was also observed that for people who had taken the modern post exposure treatment, the mean duration of the time between time of exposure and starting of the treatment was 17 days. In conclusion the incidence of the rabies in the study area could be considered high with significant public health and economic burden. A serious lack of awareness about the disease and high reliance on traditional treatment, some aspect which is scientifically implausible, was observed.

---

**Session 54****Theatre 5****Costs of the current rabies control strategies on Flores Island**

*Wera, E.<sup>1,2</sup>, Velthuis, A.G.J.<sup>1</sup> and Hogeveen, H.<sup>1,3</sup>, <sup>1</sup>Wageningen university, Business Economics, Netherlands, <sup>2</sup>Kupang State Agriculture Polytechnic, Animal Health Study Program, Indonesia, <sup>3</sup>Faculty of Veterinary Medicine, Utrecht University, Department of Farm Animal Health, Netherlands; [ewaldus.wera@wur.nl](mailto:ewaldus.wera@wur.nl)*

Rabies is a zoonotic disease and always fatal once clinical signs appear in human. The disease transmits to humans through an animal bite. Dogs are the main vector of rabies in humans on Flores island, Indonesia, resulting in about 19 deaths annually. Therefore, it is necessary to control the disease. Currently, the rabies control program at Flores island includes post exposure treatment of humans, mass vaccination and culling of dogs, and surveillance in dogs. Although the program has been in place for several years, it seems that rabies is not yet controlled. Therefore, an evaluation of the program is needed. The objective of this study is to estimate the net costs of the current control program of rabies on Flores island. A deterministic economic model has been developed to calculate the net costs of the rabies control program and of the individual components from the year 2000-2011. Data from the Health Department and Husbandry Department of East Nusa Tenggara Province were used as inputs. The result shows that the annual net costs due to vaccination, culling of dogs and surveillance (prevention) were calculated to be respectively \$US 90,420 (Rp 809.71 million), \$US 2,670 (Rp 23.9 million) and \$US 4,755 (Rp 42.6 million). The annual net costs of the post exposure treatment in humans (cure) was estimated to be \$US 172,389 (Rp 1.5 billion). Summarizing, the annual costs involved in the rabies control program add up to \$US 270,234 (Rp 2,4 billion) in total, with the post exposure treatment program being the most expensive component. The preventive measures do not seem to be effective, but the amount of money spent in prevention is lower than the amount of money spent in cure. This means that an improved control of Rabies might become cost-effective.

**Bluetongue surveillance: distribution and seasonal abundance patterns of Palaearctic *Culicoides* vector species in the Netherlands**

Scolamacchia, F.<sup>1,2</sup>, Van Den Broek, J.<sup>2</sup>, Meiswinkel, R.<sup>1,3</sup>, Heesterbeek, J.A.P.<sup>2</sup> and Elbers, A.R.W.<sup>1</sup>,  
<sup>1</sup>Central Veterinary Institute of Wageningen University and Research, Department of Epidemiology, Crisis organization and Diagnostics, Netherlands, <sup>2</sup>Faculty of Veterinary Medicine – Utrecht University, Department of Farm Animal Health, Netherlands, <sup>3</sup>Netherlands Food and Consumer Product Safety Authority, Netherlands; [f.scolamacchia@uu.nl](mailto:f.scolamacchia@uu.nl)

Surveillance systems of vector-borne diseases are based on the systematic collection of relevant information, which necessarily include data on the presence, abundance, and ecology of the vector and its interactions with the environment. Palaearctic *Culicoides* midges represented a vital link in the northward advance of the bluetongue virus serotype 8 in north-western Europe. The principal ecological determinants of weekly fluctuations in *Culicoides* vector abundances during the bluetongue epidemics in The Netherlands in 2007 and 2008 were quantified within a hurdle modelling framework. The relative role of meteorological parameters showed a broadly consistent association across species, with larger catches linked to temperature related variables and lower wind speed. Moreover, both vector abundance and species diversity were found to be influenced also by edaphic factors, likely related to the species-specific breeding habitat preferences that differed markedly amongst some species. This is the first study on the *Culicoides* vector species of The Netherlands in which an attempt is made to pinpoint those factors, which at regional scale, influence midge abundance levels and geographic range. In addition to providing key inputs into risk mitigating tools for midge-borne pathogens and disease transmission models, the adoption of methods that explicitly address certain features of abundance datasets (frequent zero count observations and over-dispersion) helped enhance the robustness of the ecological analysis.

---

**Session 55****Theatre 2****Reliability of drag sampling for tick collection on vegetation**

Agoulon, A., Raoux, O. and Vah, B., Oniris, LUNAM Université, UMR 1300 BioEpAR, Nantes, F-44307, France; [albert.agoulon@oniris-nantes.fr](mailto:albert.agoulon@oniris-nantes.fr)

Drag sampling has commonly been used to collect Ixodid ticks on vegetation, since Macleod (1932), with the aim of estimating tick densities. Only recent efforts were made for the standardization of the method, and little is known about its efficiency and repeatability. In spring 2011, a study was performed on a cattle farm near Nantes (France), selected for the presence of *Ixodes ricinus* ticks, to test the reliability of drag sampling. Forty six 10 m<sup>2</sup> transects were chosen on a priori favourable biotopes: borders of pastures adjacent to a woodland, or inside the woodland. On each transect, 1 m<sup>2</sup> flannel blanket was slowly dragged (0.5 m/s) along 10 m. Ticks were then recovered and stored for later identification and counting. Dragging was immediately repeated on the same area to accumulate 20 successive samplings. For each sampling (n#1 to n#20 on a transect), the 3 stages of *Ixodes ricinus* were counted (larvae, nymphs and adults). The evolution of the countings was then analysed for each of the 46 transects. The results were the following: (1) for nymphs, the main stage of interest, the first passage corresponded to the highest counting on 70% of the transects. The exhaustion was sometimes incomplete after 20 passages (last counting  $\geq 1$  for 37% of the transects, mostly on high tick densities), but very few nymphs remained at the end: the cumulative counting of nymphs on 20 passages was then considered to represent the total number of nymphs actively in search of a host. The percentage of nymphs collected at the first passage varied randomly between 0% and 50%, with a mean of 26%. With a leaf litter covering the ground, the efficiency of the first passage was improved to a mean of 30%, and it fell to 20% in the absence of leaves. (2) Among the 21 transects presenting adult ticks, only one half (10 transects) revealed this stage at the first passage. (3) Among the 11 transects presenting larvae, only one half (6 transects) revealed this stage at the first passage.