

## Risk of introducing African horse sickness into the Netherlands by importation of equids

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African horse sickness (AHS) is a vector-borne viral disease of equids that is transmitted by *Culicoides* spp. (*C. imicola* and *C. bolitinos*). Mortality in horses can reach 95%. AHS virus (AHSV) is an orbivirus belonging to the family *Reoviridae*, which also comprises bluetongue virus (BTV). The emergence of BTV serotype 8 in North-western Europe in 2006 has demonstrated that also Palaearctic species of *Culicoides* can be competent vectors for these orbiviruses. This has resulted in increased awareness of the risk of AHS in the Netherlands. However, not much information and data are available to evaluate this risk.

Risk modelling is a useful tool to provide insight into the major variables influencing the risk of disease introduction and can help in optimizing prevention and control strategies. To analyze the probability of release and establishment of AHSV in the Netherlands by importation of equids, an import risk analysis was conducted. Countries worldwide were grouped into three risk categories: (a) high risk, i.e., those countries in which the virus is circulating, (b) low risk, i.e., those countries that have experienced outbreaks of AHS in the past or where *C. imicola* is present, and (c) very low risk, i.e., all other countries. Imports of equids were grouped according to species: (a) horses, (b) donkeys, mules, and hinnies, and (c) zebras. A scenario tree was constructed to outline all steps required for successful release of AHSV in the Netherlands and subsequent establishment. This scenario tree was the basis for a risk model in Excel and @Risk to quantify the contribution of risk regions and groups of equids to the overall risk of AHSV introduction into the Netherlands. More insight into the relative risk of these risk regions and groups of equids will help decision-makers in prioritizing preventive measures. The model contained information on importations of equids into the Netherlands, occurrence of AHS in the risk regions, disease parameters in host species, vector biology, and import regulations. The probabilities of release and establishment were calculated taking into account seasonal effects.

First model calculations indicated that establishment of AHS in the Netherlands is only possible when average daily (24h) temperatures are greater than 10°C, i.e., in the months May up till October. The risk of introduction of AHSV is highest in July. Despite low numbers of equids imported from high risk regions and implementation of preventive measures including quarantine and testing, these regions constitute a higher average risk for AHSV introduction than low and very low risk regions. Zebras contribute most to the risk of AHSV introduction, although numbers imported are very low. The estimated risk per imported animal is, however, highest for zebras due to the virtual absence of clinical symptoms and a longer viraemic period.

Although the model returned an estimate of the probability of AHSV release and establishment in the Netherlands, absolute values are an underestimate of the real risk since only importations of equids as given by import statistics were taken into account. Furthermore, model calculations did not include the risk of introduction of AHSV by other pathways, such as vectors, live animal products and vaccines (modified live). Besides, the model contained many uncertain input parameters. Sensitivity analysis will be performed to indicate those parameters that are major sources of uncertainty in model output and those with the best options for prevention.

Key-words: African horse sickness, establishment, import risk analysis, release assessment, scenario tree