

# Evaluation of an appropriate *Culicoides* protection for horses in different housing systems in Switzerland with special reference to African horse sickness (AHS)

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## Key words

Vector protection, AHS, gnats, *culicoides*, equids, housing system

## Aim of the study

The aim of the study was to assess the effect of repellents, fans, fan with net and net with regard to their potential to protect horses in their common housing systems in Switzerland (i.e. box, box with paddock and group housing) against *Culicoides*. Biting midges of the *Culicoides* genus can serve as vectors for Orbiviruses such as African horse sickness virus (AHSV). The study focused on the efficiency of the protection systems in order to prevent or substantially reduce contact between horses and *Culicoides*. Furthermore, recommendations for equine holdings in Switzerland and other countries with similar housing systems should be formulated and horse keepers should be informed about the amount of time to built as well as costs for the recommended protection systems.

## Material and methods

Each protection system was tested in each housing system (4 nights in 2012 and 8 nights in 2013). Repellent was applied in 2012 only and discontinued, because it showed no significant effect in reducing midges in all 3 housing systems as the black light trap proved to be a too strong attractor to study any repellence effect. During both experimental years, 2 barns per housing system were observed (control and treated). A cross-over study design was used to control for potential influence of the stables and the horses on midge activity. The midges were collected from dusk to dawn using 4 (2 per stable) Onderstepoort Veterinary Institute type 8 W UV down-draught suction traps. *Culicoides* were classified on the basis of their wing patterns into three groups - Obsoletus Complex, Pulicaris Complex and other - and differentiated if they were blood-fed or non-blood-fed.

## Results and significance

The protection system net reduced the number of trapped blood-fed *Culicoides* biting midges in all three housing systems box ( $p = 0.0036$ ), group housing system ( $p = 0.0114$ ) and box with paddock ( $p = 0.0006$ ) significantly and reduced as well the number of caught total ( $p < 0.0001$ ) and non-blood-fed ( $p < 0.0001$ ) *Culicoides* midges significantly in the housing systems box with paddock and group housing system. A significant reduction of caught blood-fed *Culicoides* in the housing systems box ( $p = 0.0335$ ) and box with paddock ( $p = 0.0415$ ) could be achieved while using a fan. It can therefore be recommended to protect horses, kept in boxes or boxes with paddocks, with nets or with fans. Horses in group housing systems are best protected using a net. Three of 9 by matrix-assisted laser desorption/ionization time of flight mass spectrometry (MALDI-TOF MS) analysed samples could be identified as *Culicoides punctatus* and 6 of them as *Culicoides obsoletus*.

## Publications, posters and presentations

Lincoln, V.J. et al (2015) Evaluation of an appropriate *Culicoides* protection for horses in different housing systems in Switzerland with special reference to African horse sickness (AHS). Veterinary Parasitology, submission in preparation.

Lincoln, V.J. et al (2015): presentation foreseen e.g. at the conference: Netzwerk Pferdeforschung (Avenches) and other conferences.

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