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Routine environmental surveillance and rep-PCR fingerprinting for the management of a complex *Salmonella* outbreak in a veterinary equine teaching hospital

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A routine active surveillance program is important to control salmonellosis within a veterinary hospital. The knowledge gained from the program, related to the status of *Salmonella* carriage of patients upon admission and the level of environmental contamination within a facility, enables rapid recognition and response to outbreaks, should they occur. *Salmonella* isolates can be characterised phenotypically and genotypically, by antimicrobial susceptibility testing, serotyping and molecular based techniques. This study describes the steps taken to effectively manage a complex outbreak of salmonellosis in an equine facility and the methods used to characterise the two *Salmonella* serovars, Muenster and Newport, implicated at the time of the outbreak. Conventional bacteriological culture, antimicrobial susceptibility testing and serotyping were coupled with pulsed field gel electrophoresis (PFGE) and rep-PCR fingerprinting to characterise isolates from 9 clinically affected and 2 asymptomatic horses admitted to the hospital. During the period of the outbreak, isolates (22/179 samples) were also cultured from the hospital environment. Using rep-PCR fingerprinting, it was possible to track and differentiate each of the 2 serovars in the patients and the environment during and after the outbreak. The results generated by rep-PCR fingerprinting were comparable with profiles from PFGE of *Salmonella* genomic DNA digested with the restriction endonucleases *Xba*I and *Avr*II. The major advantages of rep-PCR fingerprinting were found to be the ease and speed with which results could be produced, compared to PFGE and the delays associated with reporting the serotypes by reference laboratories. Therefore, this technique, in combination with phenotypic tests, has the potential to provide more timely information about the epidemiology of an outbreak to aid decision making during the course of the event.

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Effect of alphacypermethrin-treated high density polyethylene mesh applied to jet stalls on African horse sickness virus vectors, jet stall microclimate and stress indicators of horses

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Culicoides biting midges (Diptera: Ceratopogonidae) are of importance to health and international trade in horses worldwide, primarily as vectors of African horse sickness (AHS) virus. During export from and transit through AHS endemic countries or zones protection measures of a chemical and physical nature are recommended by the World Organization for Animal Health to protect horses from AHS vectors. The efficacy of alphacypermethrin (20-40 mg/m^2) insecticide-treated high density polyethylene (HDPE) mesh, applied to a containerized air transport system for horses (jet stall), against *Culicoides* midges was determined by mechanical aspiration. Midges were aspirated around sunset (17h00-18h00) from two horses housed in either a treated or untreated stall, as well as from an outside sentinel horse, in four blocks of a 3 x 2 randomized design under South African field conditions. Additionally, jet stall microclimate, clinical variables and fecal glucocorticoid metabolites (FGM) of 12 horses housed overnight (16h00-06h00) in either a treated or untreated stall were monitored in two blocks of a 2 x 3 randomized crossover design under temperate climatic conditions. The alphacypermethrin-treated HDPE mesh significantly (P=0.008) reduced the number of *Culicoides* midges, predominantly *C. imicola*, mechanically aspirated from horses housed in the jet stall. The treated mesh reduced the midge attack rate in the treated stall compared to the untreated stall and the sentinel horse by 6 and 14 times, respectively. Mean (range) treated stall temperature (16.7°C [11.3-27.1°C]), was significantly higher than outside temperature (11.6°C [6.0-27.8°C]) at 10/15 time points (P=0.001–0.033), but did not differ from untreated stall temperature (14.6°C [9.2-27.1°C]). Mean (range) relative humidity (RH) in the treated stall (67.1% [29.6-79.1%]), was significantly lower than the outside RH (79.4% [34.8-96.3%]) at 7/15 time points (P=0.001–0.005), but did not differ from the untreated stall RH (70.8% [29.3-85.8%]). Temperature and RH in the treated stall were highly and significantly correlated with outside temperature (r=0.961, P<0.001) and RH (r=0.954, P<0.001), respectively. No significant differences were detected between rectal temperatures, pulse and respiratory rates of horses in the treated stall compared to the untreated stall. Mean FGM concentrations for horses housed in the treated stall peaked earlier (24 h) and at a higher concentration than horses housed in the untreated stall (48 h), but were not significantly different from baseline. No significant difference was detected in FGM

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