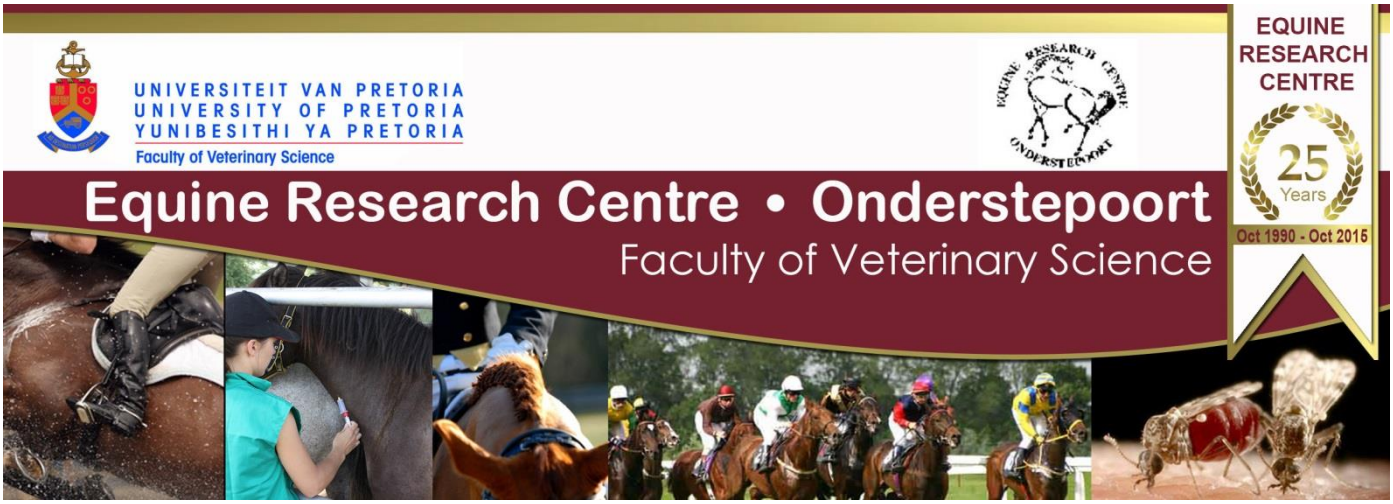

EQUINE RESEARCH … what you need to know

Brought to you by the Equine Research Centre, University of Pretoria

To all our readers, following discussions with some readers at the recent SAEVA Congress, and amongst the Equine Research Centre and Equine Health Fund teams, a decision has been made to re-structure how we communicate with you about research developments as well as general developments in the fight against the effects of African horse sickness and other equine diseases.

As research doesn't happen at regular intervals, it is sometimes difficult to give you enough information to form a monthly, or even bi-monthly ERC newsletter. With the establishment of the Equine Health Fund (EHF), which aim is to raise sufficient funds as well as to support ERC financially, and its activities which are not always ERC science based, we will now give you a bi-monthly EHF newsletter, which will give you news about anything related to equine diseases, exports, movement control etc that isn't ERC specific. ERC will give you updates on scientific breakthroughs or developments and latest published papers.

Having made this decision, it is ironic that there is quite a bit of material to include in this ERC news edition, edited papers about Midge Proof Jet Stalls and an article on the international recognition of SA scientist, Martin Schulman's paper on equine herpes. However, as these papers were only approved recently, we were unable to give you a newsletter in January or February.

We hope you will continue to find our news interesting and informative, and that you will also enjoy the EHF Newsletter, which will be forthcoming shortly.

SUMMARISED PUBLICATIONS

SAFE, MIDGE-PROOF INTERNATIONAL TRAVEL FOR HORSES ON THE CARDS

Further to our article in the January 2014 issue of the ERC Newsletter (Exciting research into ensuring horses can travel internationally 'midge free') Principal Investigator, Dr Patrick Page, and his team have over the past two years conducted research on the possibility of making jet-stalls 'midge-proof'. Two papers have been submitted on this topic, the more recent having just been published. The first paper compared the efficacy

of untreated and alphacypermethrin insecticide-treated high density polyethylene mesh against biting midges, while the second paper dealt with the efficacy of alphacypermethrin insecticide-treated mesh applied to jet stalls housing horses.

Culicoides biting midges are of economic and veterinary significance worldwide, primarily due to the Orbiviruses they transmit. They are the principal vectors of African horse sickness virus (AHSV), equine encephalosis virus and bluetongue virus in South Africa. In addition to their impact on horses and livestock in South Africa, these viruses have been shown to have a devastating effect on naïve populations, and concerns have been raised over the introduction and spread of viruses such as AHSV, and the need for optimal preventative strategies. The global expansion of containerised trade, including intercontinental movement of horses, provides potential mechanisms for introducing these viruses. While clear recommendations for pre-export quarantine and testing of horses for AHSV have been in place for many years, the World Organisation for Animal Health (OIE) have now included recommendations that an appropriate gauge mesh, impregnated with an approved insecticide be placed over containers during transport of horses through regions not free of AHSV. Measures developed to protect horses during transport should ideally also be directly applicable to protect the local horse population against AHSV.

Following are summarised versions of these two papers.

1. **Field and *in vitro* insecticidal efficacy of alphacypermethrin-treated high density polyethylene mesh against *Culicoides* biting midges in South Africa**

The objective of this study was to determine if alphacypermethrin insecticide-treated high density polyethylene (HDPE) mesh applied to light traps will reduce the entry of *Culicoides* midges, particularly *C. imicola* which is implicated as the principal vector of AHSV, into the traps. It was proposed that the results would support the potential of alphacypermethrin-treated HDPE nets for protecting horses against *Culicoides* midges, and be applicable to containerised transport systems (jet stalls) for horses.

The results showed that the HDPE mesh had a significant effect in reducing the numbers of *Culicoides* midges, predominantly *C. imicola* collected by the light trap. The magnitude of reduction for the untreated HDPE mesh and the alphacypermethrin-treated HDPE mesh was 4.2 and 7.2 times, respectively. While the light trap with the alphacypermethrin-treated HPDE mesh consistently collected fewer *Culicoides* midges than the untreated HDPE mesh, a significant repellent effect was not demonstrated, likely due to the attraction of the light overriding any repellent effect. The greater efficacy of the alphacypermethrin-treated mesh was therefore more likely due to an insecticidal effect.

C. imicola midges were additionally exposed to the treated mesh in a laboratory contact bioassay. This resulted in a rapid insecticidal effect, with the initial magnitude and rate of midge death being greater after 3 minutes exposure compared with 1 minute exposure of the midges to the mesh. Subsequently, at 30 minutes post exposure both groups had reached maximal (100%) effect which was maintained up to the final assessment at 24 hours.

The positive results of this study showed that HDPE mesh had potential to reduce exposure of housed horses to *Culicoides* midges during high risk periods for AHSV transmission, or during containerised transport. Additionally, treating the mesh with alphacypermethrin could increase the overall reduction of *Culicoides* midge biting rates.

Acknowledgments:
We thank Dr. Elisabeth Scheffer for assistance with sorting of insect catches. The Faculty of Veterinary Science Research Fund, Department of Companion Animal Clinical Studies, Equine Research Centre and the Mary Slack and Daughters Foundation are acknowledged for study funding. Peter Gibson is acknowledged for sourcing the customised mesh.

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2. Efficacy of alphacypermethrin-treated high density polyethylene mesh applied to jet stalls housing horses against *Culicoides* biting midges in South Africa

The objective of this study was to determine if alphacypermethrin-treated HDPE mesh applied to a jet stall would reduce the number of *Culicoides* midges, particularly *C. imicola* and *C. bolitinos*, mechanically aspirated ('vacuumed') from horses housed in the stalls under field conditions. This would support use of the mesh to reduce risk of midge-borne Orbivirus transmission during international transport of horses.

The study was conducted in 3-compartment commercial jet stalls, covered with 70% shade cloth treated with alphacypermethrin, at the Faculty of Veterinary Science, Onderstepoort. Comparisons between a mesh-treated and an untreated jet stall were done by 'vacuuming' midges around sunset from two horses housed in each of the stalls. An additional sentinel horse, in a paddock located 35m from the jet stalls, was monitored concurrently by aspiration of midges.

A total of 499 *Culicoides* midges were aspirated from four horses housed in two stalls and one sentinel horse during 36 collections made around sunset for 12 nights. The insecticide-treated mesh significantly reduced the number of *Culicoides* midges 'vacuumed' from horses housed in the treated stall compared with the untreated stall. The mesh reduced the *Culicoides* midge attack rate in the treated stall compared to the untreated stall and the sentinel horse by 6 times and 14 times, respectively. Furthermore, a nil midge biting rate on horses in both the treated and untreated jet stalls, along with a considerably lower biting rate compared to attack rate for the sentinel horse was determined.

'Vacuuming' of midges from horses is considered more reliable for assessment of treatment efficacy than light traps (see the summarised publication on this topic in the April 2014 issue of the ERC Newsletter). The attraction of insects to a light is an artificial response and different cues are involved in the attraction of *Culicoides* midges to hosts than towards light traps. While light traps are useful for screening for potential protection against *Culicoides* biting midges, 'vacuuming' of midges from horses is vital to confirm the protective efficacy of treatment methods.

The second study concluded that alphacypermethrin-treated HDPE mesh could be used to reduce exposure of horses to *Culicoides* midges, and the risk of midge-borne Orbivirus transmission during transport in jet-stall containers. Similarly, this mesh could be applied to stable openings to reduce the midge attach rate during AHSV outbreaks. The mesh was not 100% effective, however and therefore further investigation of use of the mesh in conjunction with additional control measures is required.

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International acknowledgement of the Equine Herpes Virus research conducted in South Africa

It was interesting to note in the latest Equine Veterinary Journal that extensive reference is made in a paper by a United Kingdom research team to the paper by Martin Schulman, Faculty of Veterinary Science, University of Pretoria, published in the same journal, and edited for the July 2014 ERC Newsletter.

The UK paper is titled, "Equine herpesvirus-1: Dealing practically but effectively with an ever present threat". This is what they said about the SA paper:

"In this edition of EVJ Schulman and colleagues (2015) illustrate 2 presentations of EHV-1 abortion outbreaks on separate Thoroughbred breeding farms in South Africa, although in both outbreaks described, recrudescence of EHV-1 from the latent state seems to have been the most likely trigger. … As reported by Schulman et al, even if adequate quarantine protocols exist for new entries to a resident population, risks remain relatively high when introducing mares in late gestation because of the risks from reactivation of latent EHV-1 even in an otherwise healthy animal. In mares in late pregnancy, transport, relocation, social group change and other forms of stress may increase the risk of latently infected horses starting nasal shedding of EHV-1 as well as the virus once of EHV-1 from the latent state seems to have been the most likely trigger. … As reported by Schulman et al, even if adequate quarantine protocols exist for new entries to a resident population, risks remain relatively high when introducing mares in late gestation because of the risks from reactivation of latent EHV-1 even in an otherwise healthy animal. In mares in late pregnancy, transport, relocation, social group change and other forms of stress may increase the risk of latently infected horses starting nasal shedding of EHV-1 as well as the virus crossing the placenta in the pregnant uterus, resulting in foetal infection and abortion. As recommended in the HBLB Codes of Practice and by Schulman et al, pregnant mares with similar foaling dates should be maintained in small groups from as early in their pregnancies as possible without transportation and re-mixing until they have successfully foaled. Pregnant mares, that arrive following transportation and social disruption, such as those bought from sales or attending veterinary clinics, should always be considered as being 'high risk' for EHV abortion and should be managed accordingly with particular due diligence to the potential risk they pose.

Aborted foetuses, placental membranes and/or dead new born foals should be immediately but hygienically removed from the ground and placed in a double wrapped strong leak proof bag or container and sent as soon as is practical to a suitably experienced laboratory for detailed investigation of the cause of abortion and, in particular, to determine whether EHV infection was involved. If EHV is confirmed, procedures outlines in the HBLB Codes of Practice should then continue to be implemented."

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