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EQUINE RESEARCH ... what you need to know

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

The Equine Research Centre (ERC), University of Pretoria (UP), and the University of Witwatersrand, in a multi-disciplinary collaboration to improve the research initiatives in African horse sickness, are delighted to present to you our Equine Research Newsletter. In this Newsletter we'll bring you up to date with some of what has transpired over the past few years, what is in progress, and what the future holds. We will then keep you updated.

Please share this Newsletter with your members/colleagues/friends – it is important that ALL horse owners are kept informed.

The Equine Research Centre (headed by Professor Alan Guthrie) is an entity within the University of Pretoria. All information in this Newsletter comes directly from the ERC and provides you with reliable information on a number of topics including African horse sickness.

Our newsletters will provide topical information concerning AHS, research on diagnostic tests and new trends in vaccines and surveillance. They will also include information on other activities within the ERC including updates on equine encephalosis virus (EEV), piroplasmiasis and contagious equine metritis (CEM).

Other diseases being researched by ERC are : Equine Influenza, Equine Encephalosis Virus (EEV), Equine Piroplasmiasis, Contagious Equine Metritis (CEM).



BREAKING NEWS!

EQUINE RESEARCH CENTRE LABORATORY APPROVED BY DEPARTMENT OF AGRICULTURE, FORESTRY and FISHERIES

A significant step has been achieved with the recent approval by the Department of Agriculture, Forestry and Fisheries (DAFF) for PCR Tests developed by the ERC to be performed by the Molecular Diagnostics Section of the Veterinary Genetic Laboratory at the Faculty of Veterinary Science. This means that results of such tests can be used by State Veterinary Officials for health and export certification of horses and can be incorporated into DAFF's official reports on these controlled diseases to international bodies and trading partners.

ABOUT THE EQUINE RESEARCH CENTRE AT THE FACULTY OF VETERINARY SCIENCE, UNIVERSITY OF PRETORIA

The Equine Research Centre (ERC) exists to conduct research that will improve and promote the health and welfare of horses and the horse industry in South Africa.



ERC has 3 main focus areas :

- Equine Infectious Diseases
- Equine Sports Medicine
- Equine Health and Welfare

According to ERC Director, Professor Alan Guthrie, African horse sickness (AHS) takes up approximately 70% of his team's time.

Excellent progress has been made on developing a new generation vaccine against AHS, and of RT-PCR tests that improve the sensitivity and specificity of detection of AHS virus, about which you'll read more in this Newsletter.

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BREAKTHROUGH IN QUICK, SENSITIVE AND SPECIFIC DIAGNOSIS OF AFRICAN HORSE SICKNESS

The control of AHS has often been hampered by the extended period required to confirm the diagnosis and therefore one of our primary areas of research has been on the development and implementation of methods to significantly reduce this time period.

A recent study that involved the testing of the blood of 503 African horse sickness (AHS) suspect horses, 503 uninfected and unvaccinated South African horses, as well as 98 samples from horses from an AHS free country compared the duplex real-time reverse transcription quantitative PCR (RT-qPCR) test developed by the ERC with the virus isolation (VI) test which is currently considered as the "Gold Standard" test for identification of AHS virus.

The results of the AHSV RT-qPCR and the VI tests for the AHS suspect horses, showed the median sensitivity of the AHSV RT-qPCR was >97.8% compared with approximately 44% for the VI. Furthermore the AHSV RT-qPCR test can be processed within 4 hours of arrival of the bloods at the laboratory, whereas VI takes up to 3 weeks before results are obtained.

The AHSV RT-qPCR test has therefore proved itself far superior to VI for the detection of AHSV, in terms of sensitivity, specificity, and the reduction in turnaround time of tests. This test enables the screening of samples from large groups of horses, is useful for testing horses prior to movement or export or for surveillance during an AHS outbreak. The severe nature of AHS and the implications of a false-negative result make it necessary to have highly accurate tests. This test is extremely useful for detecting AHSV free and infected horses, and its reproducibility now needs to be evaluated in other laboratories as a global standard for detection of AHSV.

Publication : Journal of Virological Methods 189 (2013) 30-35 - Diagnostic accuracy of a duplex real-time reverse transcription quantitative PCR assay for detection of African horse sickness virus

Research Team :

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ILLEGAL MOVEMENT OF HORSES COULD RESULT IN HUGE KNOCK-ON EFFECT

African horse sickness (AHS) is a controlled animal disease in South Africa, and because of the high potential for international spread of AHS, outbreaks in the AHS Controlled Area in the Western Cape Province have a significant impact, not only on affected properties, but also on the exportation of horses from the AHS Free Zone.

The 2011 outbreak of AHS in the AHS Controlled Area had a devastating effect and was probably caused by illegal movement of an infected animal into the area, although this could not be confirmed. This outbreak occurred in the small town of Mamre, in the Malmesbury State Veterinary District, of the AHS Surveillance Zone of the Western Cape Province.

The area around the Cape of Good Hope in South Africa has historically been free from AHS, with only sporadic outbreaks which have all been suspected to have been caused by the introduction of AHSV positive horses from other provinces. Based on this, in 1995 a protocol was submitted to the European Union (then the European Community) proposing the establishment of an AHS Free Zone in the Cape Peninsula, from which export of horses could resume, provided certain conditions were met. This was accepted by the EU in 1997 and again allowed the direct export of horses from the AHS Free Zone of Metropolitan Cape Town to European Union Member States.

Subsequent to the implementation of regionalisation, two other AHS outbreaks have occurred within the AHS Surveillance Zone, in the Stellenbosch district. These outbreaks were a result of AHSV serotype 7 in 1999, when 32 horses died, and of AHSV serotype 1 in 2004, when 16 horses died. In February 2011 the outbreak in Mamre, recording 73 fatalities, again resulted in the suspension of horse exports directly from South Africa to the EU and other countries.

Thanks to the quick and decisive actions of Veterinary Services, Western Cape Department of Agriculture who enlisted the assistance of a number of partners including the Equine Research Centre (who donated vaccines, 289 of which were administered, with dramatic results), Racing South Africa, the Cape Breeders' Club and the Acorn Group of companies who assisted with covering the enormous costs resulting from this outbreak (a conservative estimate of R850 000), it was quickly and effectively brought under control. The City of Cape Town Disaster Management and the Stellenbosch Provincial Veterinary Laboratory also made significant contributions to the control of this outbreak.



At the time of the outbreak, South Africa was exporting on average 200 horses per annum. The revenue loss to industry stakeholders directly involved in the logistics of exporting horses is estimated at R20 million per annum. There was also a loss of foreign investment as a result of a decrease in direct exports which was estimated at R200 million per annum, 33% of which was offset by importers utilising alternative shipping routes via Mauritius.

The speedy and cohesive response to this outbreak, which resulted in it being brought under control very quickly, highlighted the importance of Private Public Partnerships to control diseases such as AHS.

It needs to be understood that the vaccination requirements dictated by the Movement Control Protocol for horses are there to prevent the disease from spreading via horses moving from affected areas to the surveillance area. This also applies to movement restrictions in the AHS Controlled Area that are put in place by the State Veterinary Services in the Infected parts of South Africa during the AHS season, when the risk of moving a horse that may be carrying the virus undetected into the Controlled Area is much higher. The equestrian associations and their members who rely on the movement of horses for their events must continue to ensure that the correct procedures are followed when moving horses.

Publication : Journal of the South African Veterinary Association, Vol 84, No. 1 (2013) - The 2011 outbreak of African horse sickness in the African horse sickness controlled area in South Africa

Research Team

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DEVELOPMENT OF SEROTYPE SPECIFIC RT-qPCR TESTS FOR AFRICAN HORSE SICKNESS

The recent development of PCR testing for African horse sickness virus (AHSV) has shown this method to be quicker, more sensitive and more versatile than the historically used viral isolation (VI) method. The Equine Research Centre team took the PCR tests to the next level, with the aim of developing 9 serotype-specific tests for AHSV.

The serotype specific AHSV RT-PCR tests developed in this study identified the serotype of 99 reference and archived viruses examined for the study. Furthermore, the tests have been applied to more than 250 field samples received from South Africa and other African countries, and have specifically identified the serotype in these viruses. These tests can be completed within 4 hours of receipt of samples, and can be performed on whole blood samples.



The use of these tests in the field has greatly assisted in determining the best vaccine (bottle 1 or bottle 2 of the OBP AHS vaccine) to use, which contains the appropriate serotypes of AHS, thus making it possible to control and manage the outbreaks in the field. The next step is DAFF approval of this test.

Publication : Journal of Equine Veterinary Science 32 (2012) S3-S95 - Development and initial characterization of serotype specific RT-qPCR assays for African horse sickness virus

Research Team

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That concludes this issue of the ERC Newsletter.

In future issues, read about Vaccine Development, an Electronic Test submission protocol in the pipeline, Surveillance and Export Protocols. If you would like to comment, or request specific information, please don't hesitate to contact N-J Freeman on nfreeman@witshealth.co.za – she will either respond directly or forward your query to the relevant experts for a response.

Thank you for your interest!