‘Control and Mitigation of Bovine Viral Diarrhoea in Australian Cattle Populations’

by

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2 Abstract

Bovine viral diarrhoea (BVD), more commonly in Australia as Bovine Pestivirus, is an economically important disease of cattle. The causative agent, BVD virus (BVDV), is a member of the genus Pestivirus in the family Flaviviridae, closely related to Border Disease Virus and Classical Swine Fever Virus. An increased incidence and severity of secondary disease and potentially dramatic reproductive loss associated with BVDV infection results in ongoing financial impacts in infected herds. Fortunately, the epidemiology of BVD is such that the disease can be effectively controlled, and losses mitigated, by identification and removal of persistently BVDV infected (PI) cattle. Regional or national control schemes have been shown to be economically beneficial. In Australia, however, no regional schemes are active for the control of BVD.

The first clinical case of BVD was reported in Australia in 1957. Recent serological evidence suggests that BVD may be the most prevalent infectious disease of cattle in Australia today. Despite this, BVD fails to be acknowledged as a major animal health priority. A postal survey of 631 South Australian cattle farmers showed that while interest in BVD was high, many producers did not believe their herds to be infected and failed to acknowledge the true impact the disease may have in an affected herd. The survey results revealed that farmers that practiced disease management through quarantine procedures, regular vaccination, participation in disease control and attendance at seminars were most likely to have high knowledge and perceived understanding of BVD. The survey results suggest that a BVD education program (which could be targeted to farmer demographics that were observed to have the lowest knowledge of BVD) and subsequent control scheme would likely be well received.

Control schemes rely on accurate diagnosis of BVD, with rapid, inexpensive tests (such as ELISA and RT-PCR) available for detection of specific antibody, viral antigen and viral RNA. A thorough understanding of the pathogenesis of BVD allows veterinarians and diagnosticians to appropriately select diagnostic samples and tests that are most appropriate and cost-effective for a particular diagnostic goal. Milk samples represent an alternative for testing of lactating

animals for BVDV-specific antibodies, with test performance observed to be very good compared to serum testing. Furthermore, bulk milk may be tested to produce an estimate of seroprevalence within the milking herd and, in turn, the likelihood of the herd being actively infected. In non-milking cohorts, including beef animals and young stock, pooled serum can be tested for a similar result. These bulk samples are a highly cost-effective testing option.

An experimental trial investigated diagnostic opportunities in pregnant females and their resultant calves. In pregnant females, very high antibody levels should cast suspicion of fetal PI, while low positive results may coincide with neurological deformation (hydrocephalus and cerebellar hypoplasia) in the developing calf, resulting in clinical signs such as ataxia, astasia and wide-based stance. In the calves, ingestion of colostrum interfered with diagnosis of PI status until maternal antibody levels waned. Ear notch samples were least affected by interference, while serum and swab samples were similarly affected.

3 Declaration of Originality

I certify that this work contains no material that has been accepted for the award of any other degree or diploma in any university or other tertiary institution and, to the best of my knowledge and belief, contains no material previously published or written by another person, except where due reference has been made in the text. In addition, I certify that no part of this work will, in the future, be used in a submission for any other degree or diploma in any university or tertiary institution without the prior approval of the University of Adelaide and, where applicable, any partner institution responsible for the joint award of this degree.

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