



## Collaboration points way to Johne's-resilient bloodlines

**A deer stud and a university have collaborated to turn the grim and costly task of testing and culling for Johne's disease (JD) into a promising line of research.**

*Peel Forest sells only 3-year-old stags, which have been repeatedly tested for JD.*

Peel Forest Estate has teamed up with Otago University's Department of Microbiology and Immunology to not only combat JD in the Peel Forest stud herd, but also to explore ways to identify individual animals and bloodlines in the herd that show resilience against the disease.

The herd at Peel Forest was hit hard by JD in 2000, and the stud was forced to withdraw from selling live animals. Owner Graham Carr decided to meet the challenge through an intensive programme of testing and culling using the Paralisa test.

In doing so Graham had to make some hard decisions, culling some apparently healthy animals that the testing programme had selected.

While all farms undertaking a test and culling programme are faced with similar decisions, the detailed stud database at Peel Forest has enabled Otago University's Professor Frank Griffin to retrospectively analyse the pedigrees of infected, uninfected and diseased animals, thus identifying susceptible and resilient lines.

Frank says a significant number of the culled animals have been subjected to post-mortem follow-up, to accurately establish their status with respect to infection or disease.

"The purity of Graham's bloodlines and access to multiple embryos from individual dam/sire combinations has been extremely helpful in identifying breed effects," Frank says, adding that the access to animals from the stud breeding programme "has provided a scientific platform for genetic studies which I believe will never be duplicated again in any species of domestic livestock. I believe this programme has produced some of the most informative findings I have been party to in almost 40 years as a researcher."

What they have found is that animals from some bloodlines, including one known as B11 which are hybrid terminal sires, appear resilient to the disease.

The term resilient is chosen carefully. Frank Griffin defines it as "the ability of an individual (animal) to maintain acceptable health and productivity following exposure to infection".

This is distinct from resistance, which is an ability to remain free from infection. "Resilience is a relative term which measures the negative impacts of infection," he explains.

While the collaboration has revealed some linkages between resilience and certain bloodlines, there is clearly more to be discovered about mechanisms of these links. "Our goal is to

identify the small group of genes associated with functional immune responsiveness that contribute to resilience. We are convinced that no single gene will define this trait but it will result from a small number of genes working in consort," Frank says.

He is confident that stags from the resilient bloodlines being identified at Peel Forest could improve the JD resilience of their offspring. He adds that the ultimate challenge is to ensure that production traits and resilience traits are co-selected, and that superior genetics are not lost to the industry.

"As Peel Forest Estate continues down the pathway to produce resilient deer and with the knowledge that we are gaining regarding breed and bloodline influence, our breeding focus is changing. We will still retain our strategy of producing genetics that will assist the industry to improve productivity. However, we will focus on resilience as being equally important. DBVs are important, but the fitness of animals used either for finishing or as replacements is equally important in order to sustain high performance animals that farmers need," says Graham Carr. He says Peel Forest sells only 3-year-old stags that have been repeatedly tested for JD.

On the question of the role of resilient animals in the spread of JD, Frank says that, intuitively, resilient animals would pose either no risk or a significantly lower risk for the spread of *Mycobacterium paratuberculosis*, "but proving this would be very expensive as it would require exhaustive microbiology monitoring to be carried out on large numbers of slaughtered animals."

He says there is no reason other studs also facing a Johne's challenge on their properties could not undertake a similar programme, provided they were prepared to make the serious investment needed in elective culling. "Perversely, a strong JD challenge offers the bonus of selection for resilience among purebred animals, although the attendant cost of culling susceptible animals is significant."

*Deer Industry News* spoke to a number of other scientists involved in deer health and genetics research about the successful collaboration between Peel Forest Estate and Otago University. The development was generally welcomed, but the scientists said they were looking forward to further independent analysis of the data that the work has yielded so far.