Genetic Analysis of Flystrike in sheep

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Abstract

Flystrike in sheep is a parasitic disease where eggs or larvae are deposited onto the host and is predominantly caused by the sheep blowfly *Lucilia cuprina*. Flystrike can cause production losses, chronic disease and death in sheep. There are many predisposing factors which contribute to flystrike occurring and these include: environment, management and physical attributes of the sheep. Flystrike is estimated to be the fifth largest cost to the Australian sheep industry, with breech strike identified as the most significant type of flystrike. Various management practices are used to control breech strike, including mulesing, shearing and chemical application. Increasing pressure from animal welfare groups and consumer resistance to purchase wool products derived from mulesed sheep has contributed to identifying alternative methods to control breech strike. One alternative method is breeding sheep resistant to breech strike. As the expression of flystrike is environment dependent, and direct selection is ethically and economically undesirable, indicator traits which can be used for indirect selection offers an alternative method to breed for resistance to breech strike.

Preliminary research has identified that breech strike resistance is heritable, and potential indicator traits for breech strike were environment dependent, for the summer and winter dominant rainfall areas in Australia. A review of literature revealed that there were no genetic parameter estimates for breech strike in the non-seasonal rainfall zone. The non-seasonal rainfall regions represent a large proportion of the Merino population in Australia.

The objectives of this study were to establish the magnitude of heritability for breech strike resistance in non-mulesed sheep in the non-seasonal rainfall zone, and investigate the phenotypic and genetic relationships of breech strike with other visual and measured production traits, with the resulting genetic parameters used to identify potential indirection selection criteria to breed breech strike resistant sheep in the non-seasonal rainfall environment.

Flystrike and potential breech strike indicator trait heritability estimates derived from this study ranged from low to high and were similar in magnitude to those

obtained in other environments. This study also found significant maternal permanent environment and sire by dam breed effects, which contributed to breech strike expression. These effects have not been previously reported in other studies.

Breech strike potential indicator traits identified for the non-seasonal rainfall zone were: yearling breech wrinkle, crutch cover, neck wrinkle, wool cover and marking age breech cover. These traits differed in rank to other environments, confirming that breech strike indicator traits are environment dependent. Genetic correlations between breech strike, visual and measured traits, revealed that a combination of favourable and unfavourable relationships exist, which all should be taken into consideration for selection and breeding purposes.

Certification of thesis

I certify that the substance of this thesis has not already been submitted for any degree and is not currently being submitted for any other degree or qualification.

I certify that any help received in preparing this thesis and all sources used have been acknowledged in this thesis.



Signature of Candidate

19/07/2015

Date

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