Variation in ovine RAS Guanyl Releasing Protein 1 (RASGRP1) gene and its association with flystrike in NZ sheep

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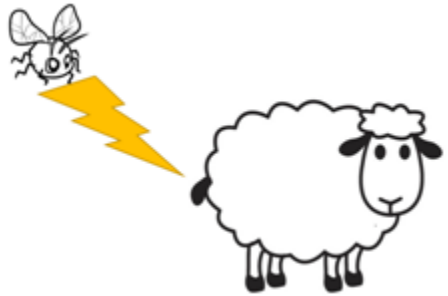


Flystrike in New Zealand

- First report in 1890
- Arrival of *Lucilia cuprina* in the late 1970s increased the prevalence of flystrike
- Major cost to the sheep industry
- One focus is to breed sheep that are less susceptible to flystrike

Genetics of flystrike susceptibility

Key *factors* involved in resistance

- Wool (lice and tick infestations)
- Skin
- Immune system

Many *heritable traits* predispose sheep

- Fleecerot susceptibility
- Footrot susceptibility
- Dag accumulation

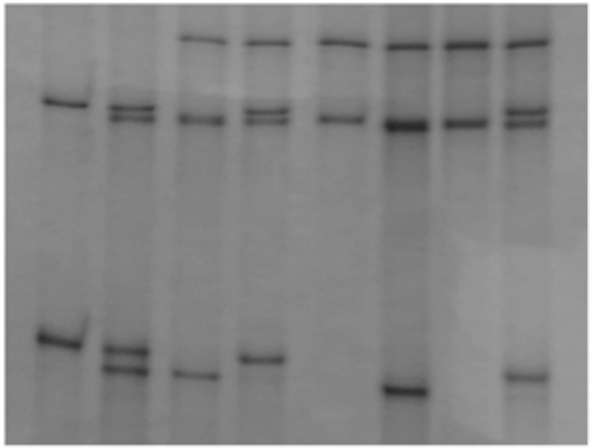
RASGRP1

- Involved in immune responses
- Research identifies *RASGRP1* as a potential candidate gene for flystrike susceptibility
- 17 exons long located on chromosome 7.
- Is expressed at elevated levels in T cells, but also in B cells, NK cells and mast cells
- Specifically involved in the T cell receptor (TCR) signalling pathway

Methods

- Blood samples collected over 5 years
- 421 sheep with flystrike
- 370 without flystrike
- PCR-SSCP analysis used to analyse *RASGRP1* variation

Results



	A	B	C
c.2002C<T	T	T	C
c. 2122T<C	C	T	T
c.2146T<C	C	T	T

PCR-SSCP patterns for the three variants (*A, B* and *C)* of an exon 16 fragment from *RASGRP1* and three SNPs

Results

Multivariate binary logistic regression model for flystrike and variants of ovine *RASGRP1*, accounting for significant explanatory factors.

RASGRP1 variant	Odds Ratio	95% Confidence Interval Lower	Upper	P value
A	1.557	1.091	2.221	**0.015**
B	1.236	0.914	1.671	0.169
C	0.733	0.539	0.996	**0.047**

Discussion and Future Directions

- Variants *A* and *C* were associated with the occurrence of flystrike
- Results confirm a potential role for *RASGRP1* - consistent with the GWAS undertaken by Pickering (PhD - 2013)
- Need to investigate expression of *RASGRP1* in sheep with active flystrike
- Need to better understand role of variation in the whole ovine RASGRP1 gene

Questions