Investigating genotype x environment interactions for indicators of host resistance to gastrointestinal parasites in Merino sheep

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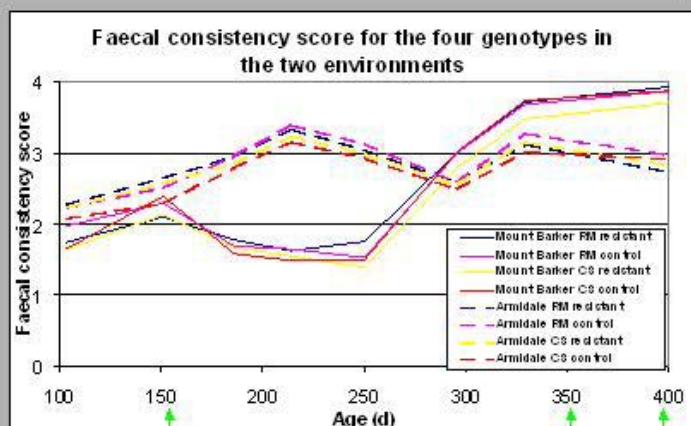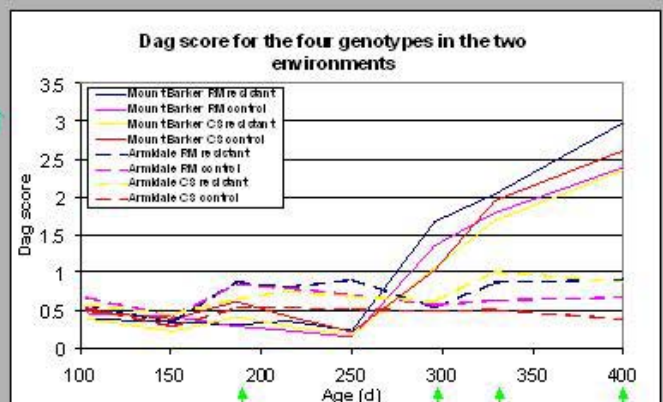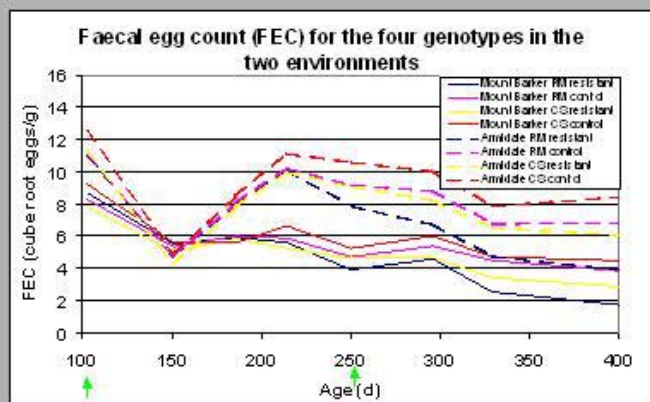[3]CSIRO McMaster Laboratory, Armidale, NSW 2350, Australia
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Questions

➢ Do genes for gastrointestinal worm resistance give the same relative levels of immunity in different environments?
➢ Is scouring (diarrhoea) related to parasite resistance?
➢ Is there a genotype-by-environment interaction in scouring?

Approach

➢ Resistant and control lambs from two sources kept in two contrasting environments
➢ *Genotypes* – Rylington Merino (RM; Western Australia) and Chiswick Haemonchus line (CS; New South Wales) selected for resistance to parasites (Low faecal egg count). Two control groups typical of their respective localities used as well.
➢ *Environments* – Mount Barker Research Station (Western Australia) in a Mediterranean climate; Chiswick Research Station (Armidale, New South Wales) in a summer rainfall environment both with contrasting worm distributions

➢ Lamb faecal egg count (FEC), dag score (DS) and faecal consistency score (FCS) measured 8 times from weaning (100d) until 400d
➢ Analysed to investigate genotype-by-environment effects (GxE) on the 3 traits

Faecal egg count (FEC) for the four genotypes in the two environments

Dag score for the four genotypes in the two environments

Faecal consistency score for the four genotypes in the two environments

Outcome

➢ FEC, DS and FCS contrasted between sites
➢ Little evidence of GxE (↑) except at oldest ages for DS and FCS
➢ Scouring not strongly related to parasite resistance

Take away message

➢ Offspring from rams bred for gastrointestinal parasite resistance give similar relative levels of resistance in widely contrasting environments
➢ Little link between parasite resistance genes and scouring
➢ Low level of GxE for scouring