

# 2018 BREECH FLYSTRIKE RD&E TECHNICAL UPDATE

Rate of Genetic Gain in Reducing  
Breech Flystrike

Dr Forbes Brien – University of Adelaide

Dr Sam Walkom – AGBU, Armidale

17 July 2018



## Rate of Genetic Gain in Reducing Breech Flystrike

- ❑ In late 2014, AWI requested a study to predict rates of genetic gain in reducing breech flystrike, using available information at that time
- ❑ Updated information is now available from both research flocks that have been crutched at usual time for Industry, so predictions have been updated to make them more relevant to Industry

# Key questions being addressed in project

- Using current knowledge, how long will selection take to produce sheep that have high resistance to breech flystrike and do not need mulesing?
- What is likely to happen to the productivity of these sheep?
- What influence do sheep type and environment have on the results?
- Can we speed up genetic changes in the sheep?

# Sheep types & production systems

The project is considering:

- fine, medium and dual purpose sheep types
- regions of high vs low dag prevalence & high and low Worm Egg Count prevalence
- ram breeding flock gains
- commercial flock gains (results not presented)

# Genetics of breech strike studied in 2 environments

## Mediterranean environment in WEST vs Summer rainfall in NORTH EAST

AWI funded 2 research sites from 2005. Since 2010, all sheep crutched, but unmulesed:

**WEST** - Mt Barker/Katanning, WA – high dag prevalence, but plainer-bodied sheep

- *Heritability of breech strike = 0.10, (Low) – main risk period of 2 months in spring*
- *Breech strikes per sheep/yr = 0.04-0.10 (4%-10%); under a no prevention regime*

**NORTH EAST** - Armidale, NSW – low dag prevalence, fine/superfine sheep

- *Heritability of breech strike = 0.20 (Moderate) – longer risk period Sept to April*
- *Breech strikes per sheep/yr higher = 18% in weaners, 8% in yearlings, 17% in adult ewes; under a no prevention regime*

## Predictions of Genetic Gain after 10 years of selection for ram breeding flocks. **These are being re-worked**

3 new indexes, which include breech wrinkle, dag and breech cover (breech traits)

- Dual Purpose Plus + breech traits
- Fibre Production Plus + breech traits
- Wool Production Plus + breech traits

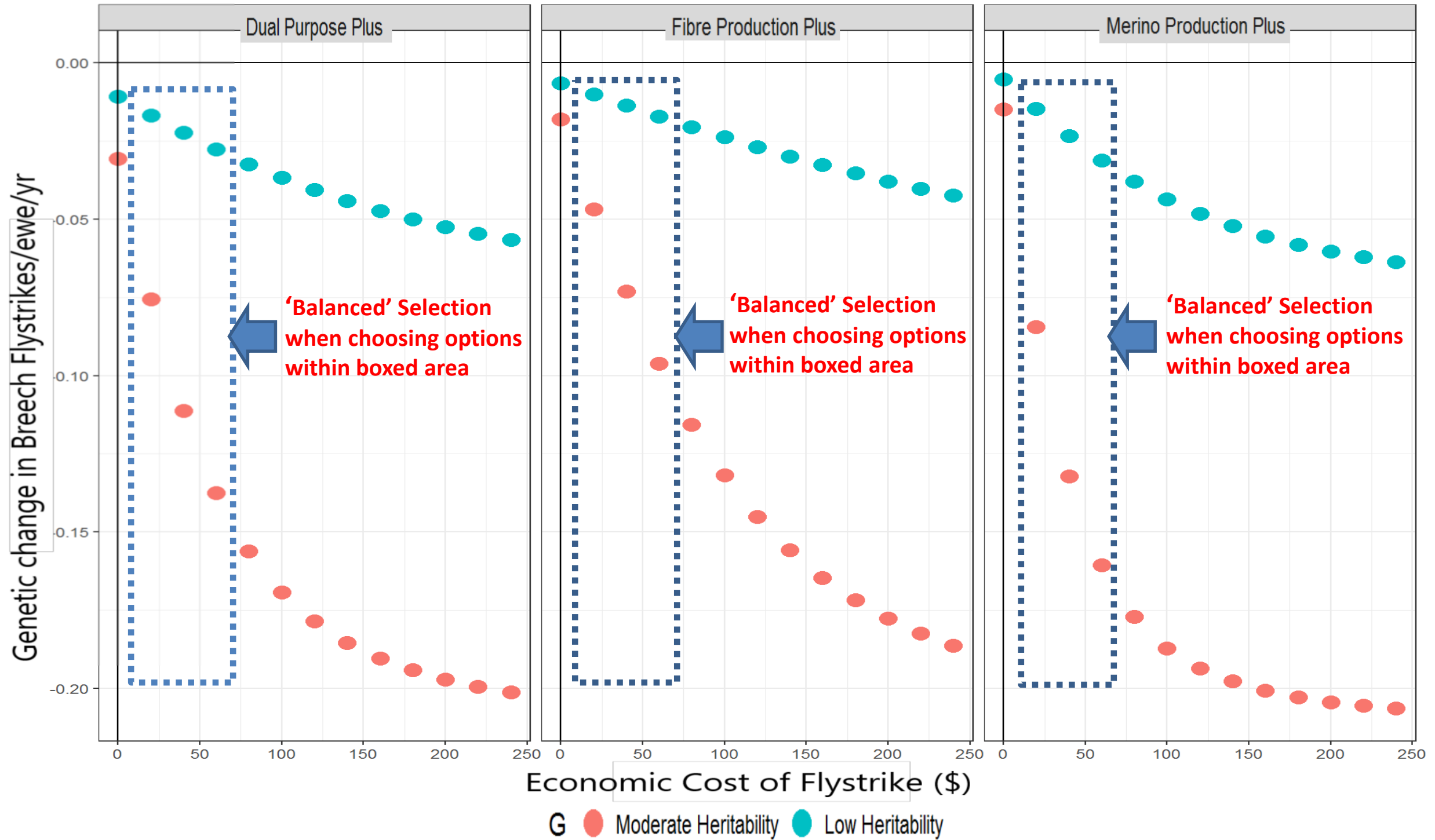
All done for **low (as in WEST)** and **moderate (as in NORTH EAST)** heritability situations

*Further work required to account for higher dag prevalence & heritability in WEST*

## What else has been considered/assumed?

- Selection required for both reduced breech strike incidence AND increase productivity
- A range of emphasis on reduced breech strike incidence from zero to very high
- A typical flock structure and realistic performance for a ram breeding flock
- Allowance for only 65% of the selection emphasis to be placed on selection index values, other 35% is on other information, such as visual assessments
- Flock has pedigree information, so can identify sire, dam and half-siblings

# Predicted Gains over 10 years – breech flystrike

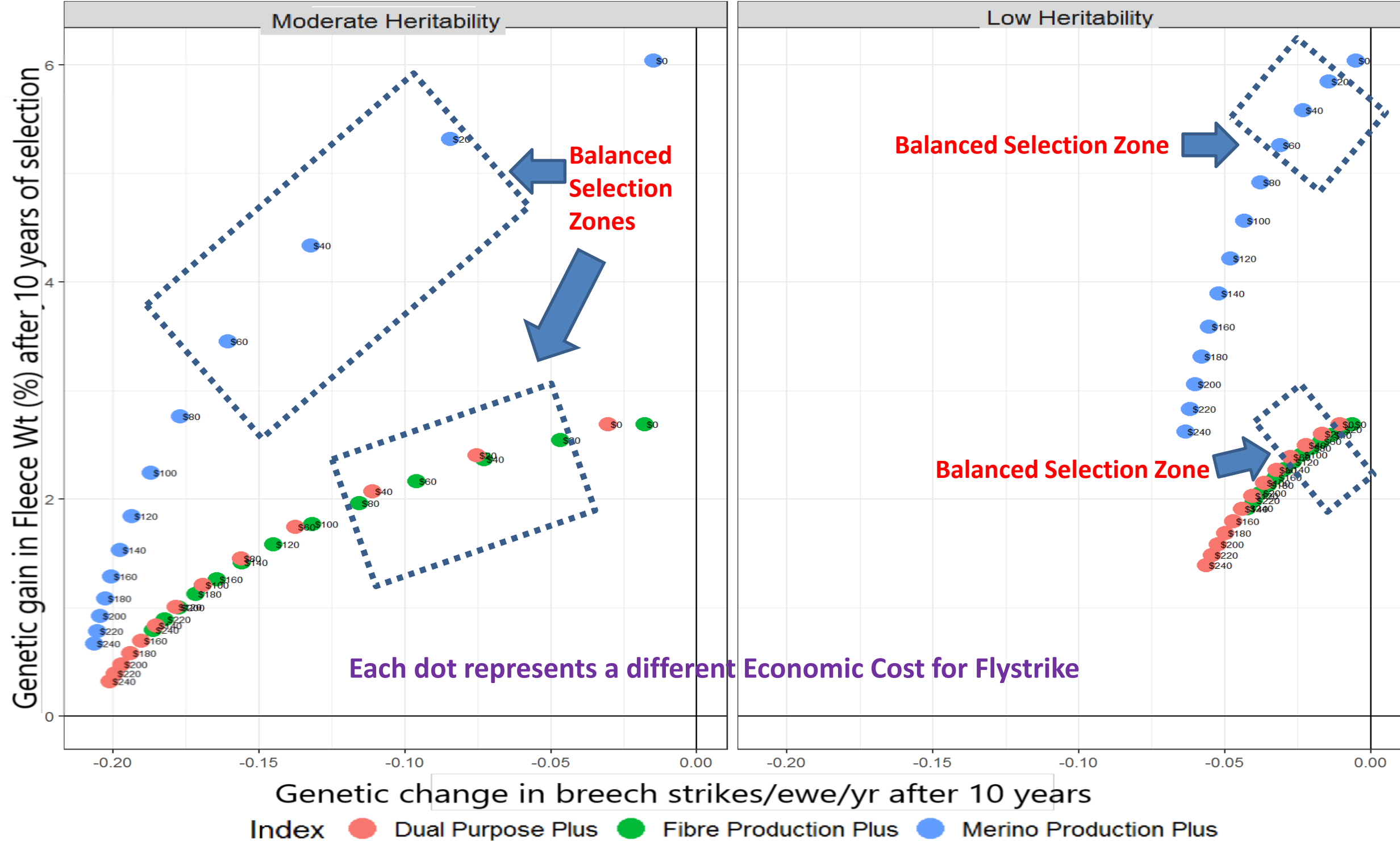




# Predicted genetic changes in breech strike incidence

- ❑ 3 graphs, from left, for DP+, for FP+ and for MP+ indexes, plus breech trait records
- ❑ 'Balanced' selection - balances reducing breech strike with gains in productivity traits
- ❑ Over 10 years, with balanced selection, predict a ram breeding flock could:
  - ❑ *In Mediterranean environment, reduce incidence by 1 to 3 breech strikes/100 ewes/year*
  - ❑ *In spring-summer rainfall area, reduce incidence by 5 to 16 breech strikes/100 ewes/year*
- ❑ Larger gains for fine and medium Merino types more likely to match MP+ & DP+ Indexes
- ❑ Faster genetic gains are possible, but at the expense of gains in the productivity traits

# Predicted Gains over 10 years - *Fleece Wt vs Breech Strike gains*



# Trade-offs in genetic gains: reducing breech strike vs gains in Fleece Weight

- ❑ 2 graphs shown, on left is for Moderate Heritability as in NORTH EAST, on right is for Low Heritability, as in WEST
- ❑ With increasing selection emphasis on reducing breech strike
  - ❑ Genetic gains in Fleece Weight decrease
  - ❑ However, gains in Fleece Weight are still good in 'Balanced' Selection zone, as shown on graph
- ❑ Less flexibility in WEST (low heritability)
  - ❑ Greater trade-offs with Fleece Weight with increasing emphasis on reducing breech strike than in NORTH EAST

## Main Messages

- ❑ *Can make worthwhile genetic reductions in breech strike incidence over 10 years*
  - ❑ *When using breech trait records*
  - ❑ *With 'balanced selection' for reducing breech strike & increasing productivity*
  - ❑ *Gains better when heritability is moderate, as in NORTH EAST*
  
- ❑ Trade-offs between genetic gains in reducing breech strike & gains in fleece wt
  - ❑ *Yes, they exist, but there is a sensible zone for 'balanced selection'*
  
- ❑ The project is still in early stages – more results to come

## Suggested Next Steps For Breeding R&D

- Need ASBVs for Urine Stain and Faecal Consistency
- Calculate economic values for breech strike incidence for different wool-growing regions
- Include breech strike incidence as a reportable trait as part of index options by the MerinoSelect service
- Depending on outcome of genomic study, investigate option of progeny testing leading AI sires for breech strike resistance



This publication is based on information presented at the Australian Wool Innovation Limited (AWI) National Wool Research and Development Technical Update on Breech Flystrike Prevention held on 17th July 2018. Some information in this publication has been contributed by one or more third parties and licenced to AWI, and AWI has not verified whether this information is correct. This publication should only be used as a general aid and is not a substitute for specific advice. Any reliance on the information contained in this publication is done at your own risk and to the extent permitted by law, AWI and any third party contributors exclude all liability for loss or damage arising from the use of the information in this publication. Except to the extent permitted under Copyright Law no part of this publication may be reproduced by any process, electronic or otherwise without the specific written permission of AWI. Neither may information be stored electronically in any form whatsoever without such permission. AWI gratefully acknowledges the funds provided by the Australian government to support research, development and marketing of Australian wool. GD2792