

Breeding for Breech Strike Resistance

Update of results
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Jen Smith, CSIRO Livestock Industries
Johan Greeff, Department of Agriculture and Food WA
Geoff Lindon, AWI



Project Background

- Selection to reduce body strike has been practiced for a long time, but less is known about how to select for breech strike
- Selective breeding - widely viewed to be the best long-term option to mulesing
- **Aim:** use indicator traits - e.g. breech & crutch cover, body & breech wrinkle, dags, urine stain, fleece traits



Breeding for Breech Strike Resistance Project (2005-2010)

Funded by AWI in association with:

- CSIRO Armidale, summer rainfall/fine wool
- DAFWA Mt Barker, winter rainfall/medium wool



Armidale weaners



WA weaners (bioclipped)

Project Objectives

1. Develop industry best practice guidelines for including breech strike resistance in Merino breeding programs
2. Evaluate the effect of selection using traits thought to indicate resistance to breech strike
3. Estimate heritability of indicator traits, correlations between breech strike and indicator traits, and between indicator traits and production traits – enabling prediction of response to selection

Trial Design

- 3 selection lines
 - **Intense** (selection on sires and dams)
 - **Commercial** (selection on sires only)
 - **Control** (unselected)
- Ewe lambs sourced from selected industry flocks in 2005
- Industry AI Sires, link sires across years
- Original ewes and progeny phenotyped at several ages for:
 - Breech traits (wrinkle, wool cover, dag etc.)
 - Fleece traits
 - Body weight
 - Other disease traits
- No chemical prevention, high surveillance of animals
- Full pedigree recording
- Monitoring fly population, climate data

Contributing Flocks

Mount Barker - DAFWA ,Western Australia

2005 drop ewe weaners:

- Billandri
- Cherry Tree Estate
- J Coole & Co
- Felspar Pty Ltd
- GSARI
- C D, D N & S H Herbert
- Kilandra Pastoral Co
- Majuba
- I & D Robertson
- W M & V A Webb

Ewes for 2006 mating:

- DAFWA Research Stations:
- Badgingarra
 - GSARI
 - Mt Barker

AI Sires :

- | | |
|----------------------------|---------------|
| • Calcookara | Centre Plus |
| • Cherry Tree Estate | Cranmore Park |
| • Rylington Merino | Toland |
| • Yeendalong Farm (Abbott) | |
| •GSARI (control) | |
| • Wallinar | Margan |
| • Centre Plus WA | Moojepin |
| • Majuba | Pooginook |
| •Rylington Merino | |

Armidale, - CSIRO, New South Wales

2005 drop ewe weaners:

- Auchen Dhu Park
- Cressbrook
- Gostwyck
- Goyarra Poll
- Hazeldean
- Mirramoona
- Quambaloo Poll
- Ruby Hills
- Whyworry Park
- Yalgoo

Ewes for 2006 mating:

- CSIRO Armidale resource flock
(fine wool base)

AI Sires :

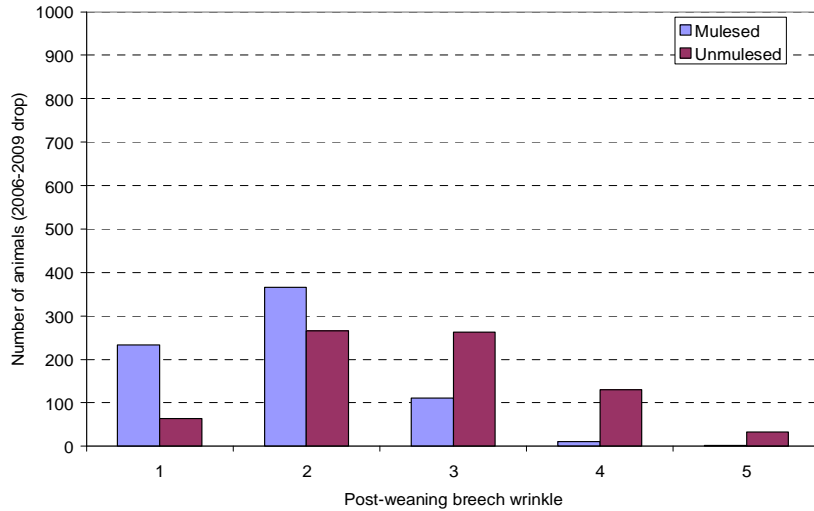
- | | |
|----------------------|----------------|
| •Cressbrook | Mirramoona |
| • Parkdale | Quambaloo Poll |
| •Petali | Roseville Park |
| •Belka Valley | Bellaine |
| • Ruby Hills | Severn Park |
| • Toland | Calcookara |
| • Centre Plus | Centre Plus WA |
| •Majuba | Stockman Poll |
| •Notrth Ashrose Poll | T13 (control) |

Differences between NSW & WA flocks

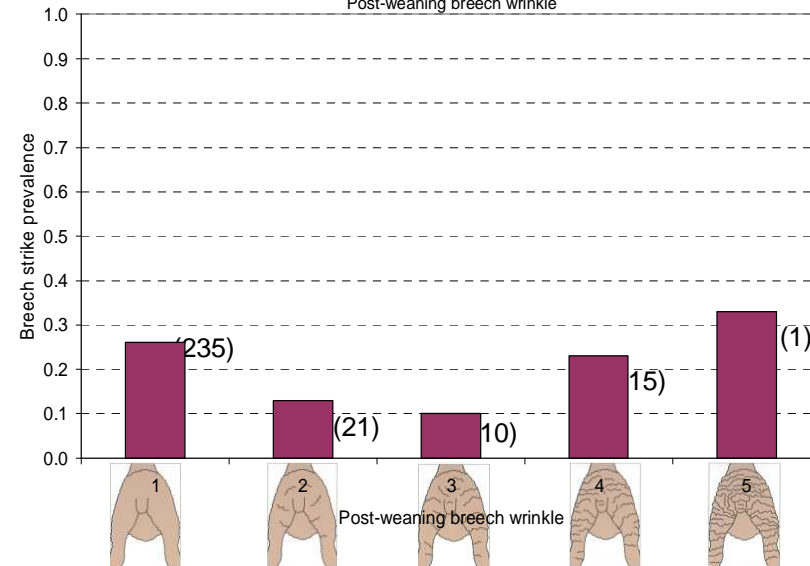
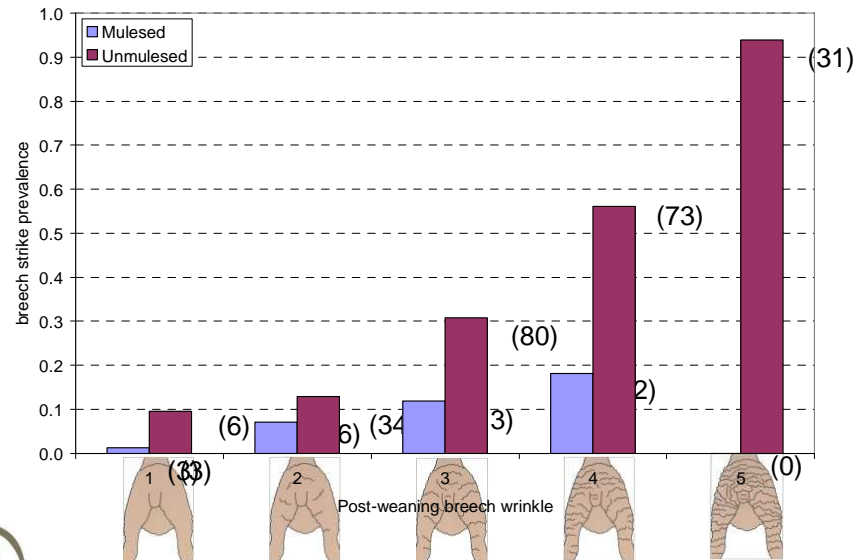
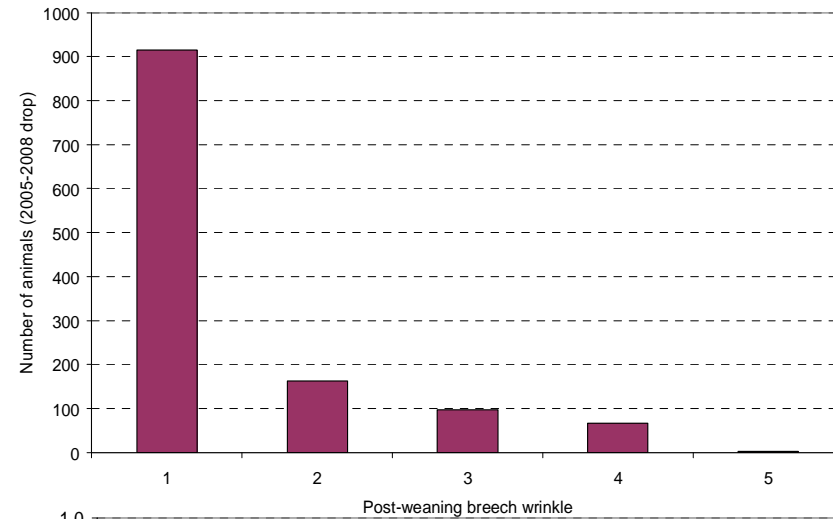
NSW flock	WA flock
Fine wool, summer rainfall	Medium wool, winter rainfall
1 st shorn as weaners (12 mths)	Shorn as weaners (4 mths) then hoggets (16mths)
Dag only recorded once (post-weaning)	Dag recorded several times
All sheep including ewes managed under high flystrike challenge conditions (no preventative chemicals, late crutching)	Only young sheep managed under high flystrike challenge conditions (not breeding ewes due to high dag impact on lamb survival)
All years ½ mulesed ½ not	No mulesing after 2007

Breech wrinkle

Armidale CSIRO, 2006-09 drop weaners, mulesed and unmulesed



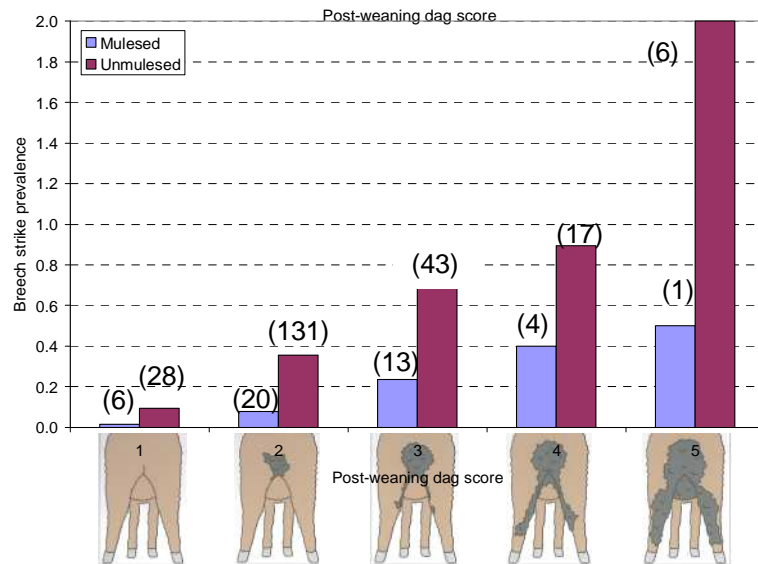
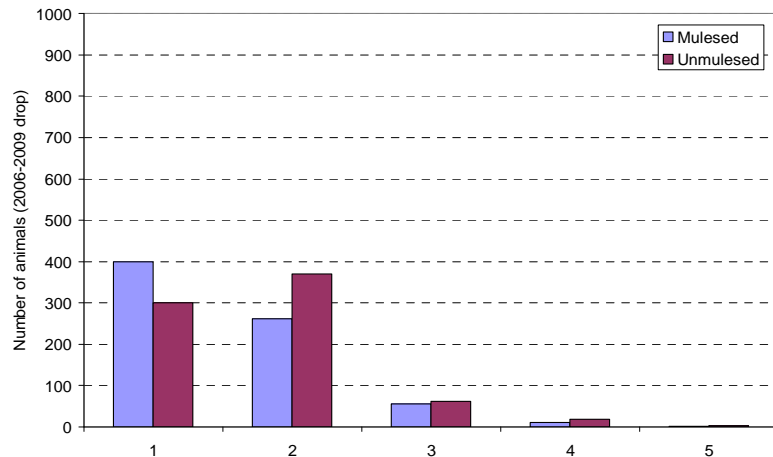
Mt Barker DAFWA, 2005-2008 drop weaners, unmulesed only



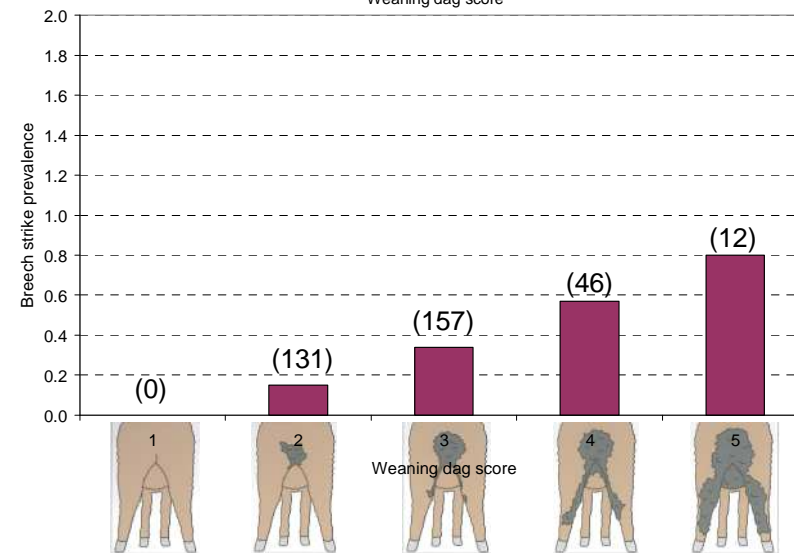
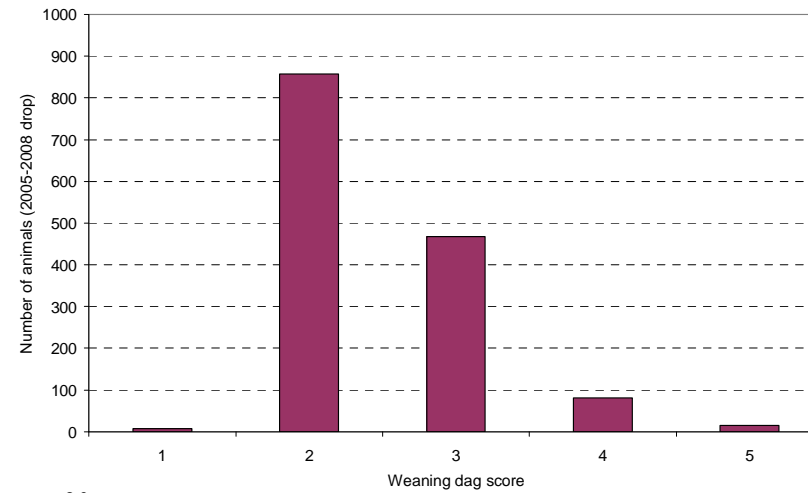
(Numbers in parentheses indicate number of animals struck, tail and breech)

Dag

Armidale CSIRO, 2006-09 drop weaners, mulesed and unmulesed



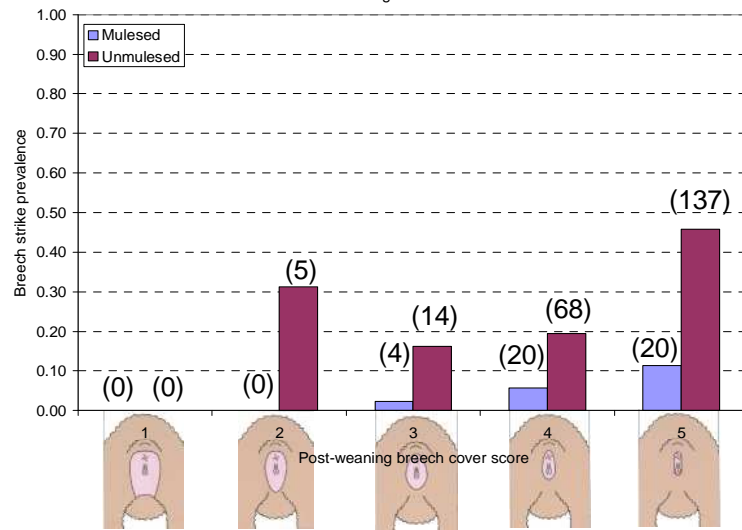
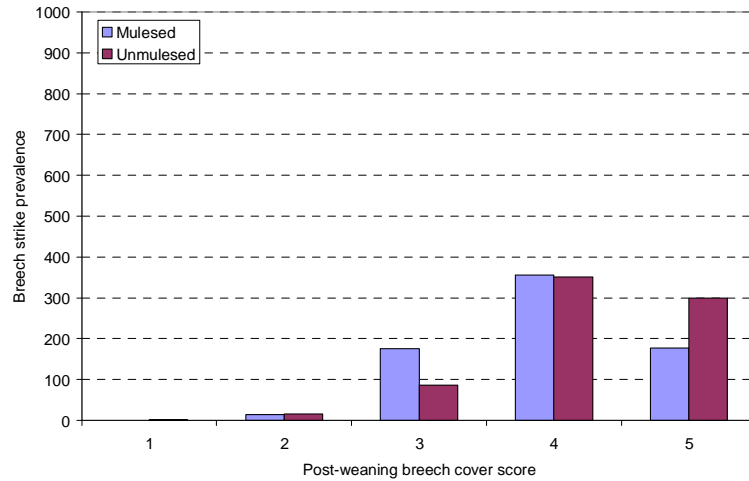
Mt Barker DAFWA, 2005-2008 drop weaners, unmulesed only



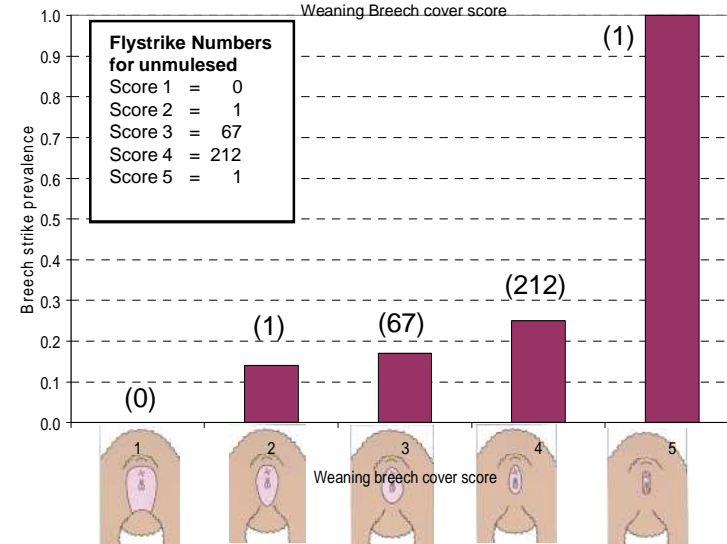
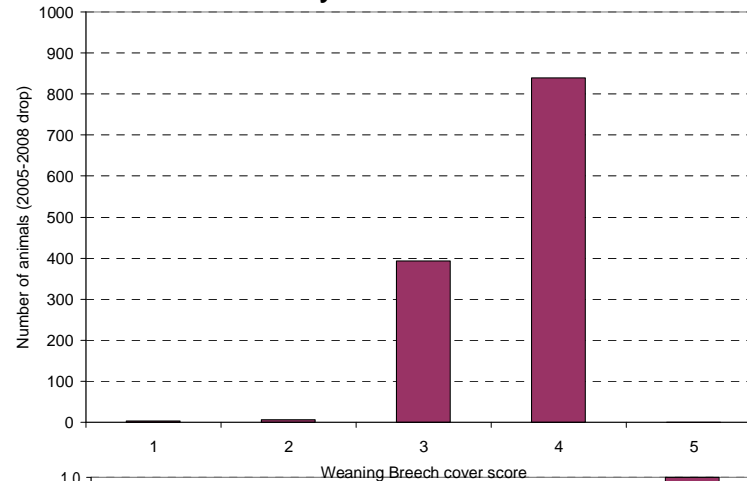
(Numbers in parentheses indicate number of animals struck, tail and breech)

Breech cover

Armidale CSIRO, 2006-09 drop weaners, mulesed and unmulesed



Mt Barker DAFWA, 2005-2008 drop weaners, unmulesed only

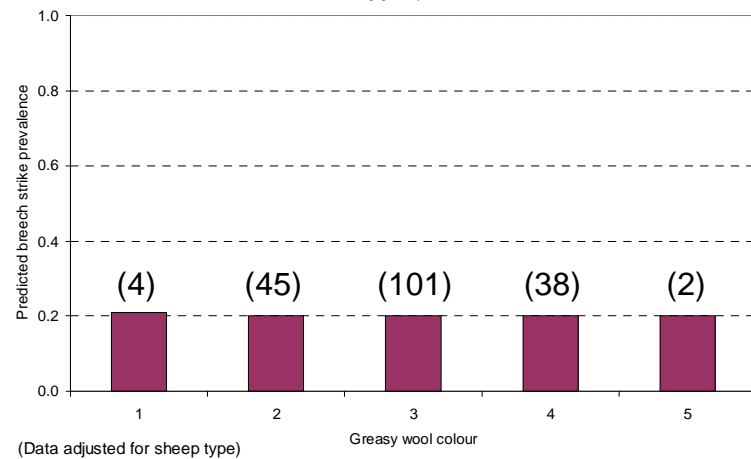
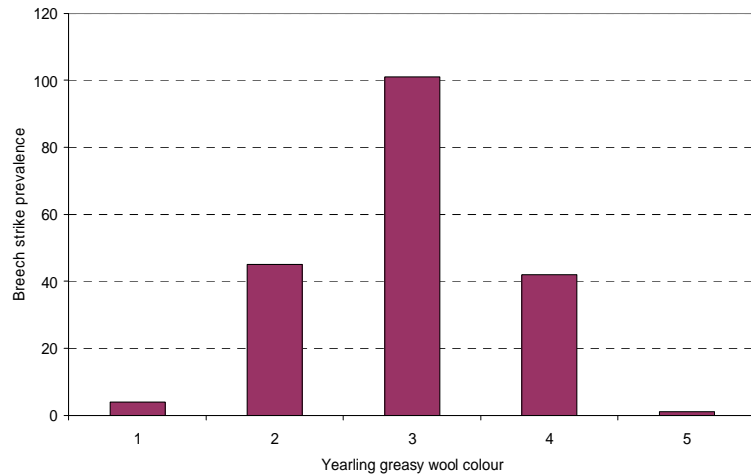


Flystrike Numbers for unmulesed
 Score 1 = 0
 Score 2 = 1
 Score 3 = 67
 Score 4 = 212
 Score 5 = 1

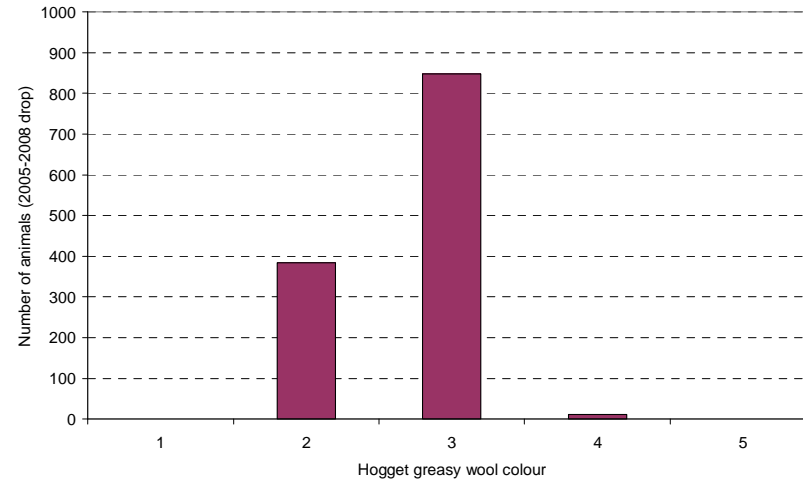
(Numbers in parentheses indicate number of animals struck, tail and breech)

Wool colour

Armidale CSIRO, 2006-08 drop weaners, mulesed and unmulesed (combined)



Mt Barker DAFWA, 2005-2008 drop hoggets, unmulesed only



(Numbers in parentheses indicate number of animals struck, tail and breech)

The 'best' *versus* the 'rest'

Although original design was based on selection lines (intense and commercial versus control), recent examination of data has focussed also on preliminary 'BEST' *versus* 'REST' categories for young sheep.

Weaners (NSW)

'Best' = $BRWR \leq 2$ AND $DAG \leq 2$

'Rest' = $BRWR \geq 3$ AND/OR $DAG \geq 3$

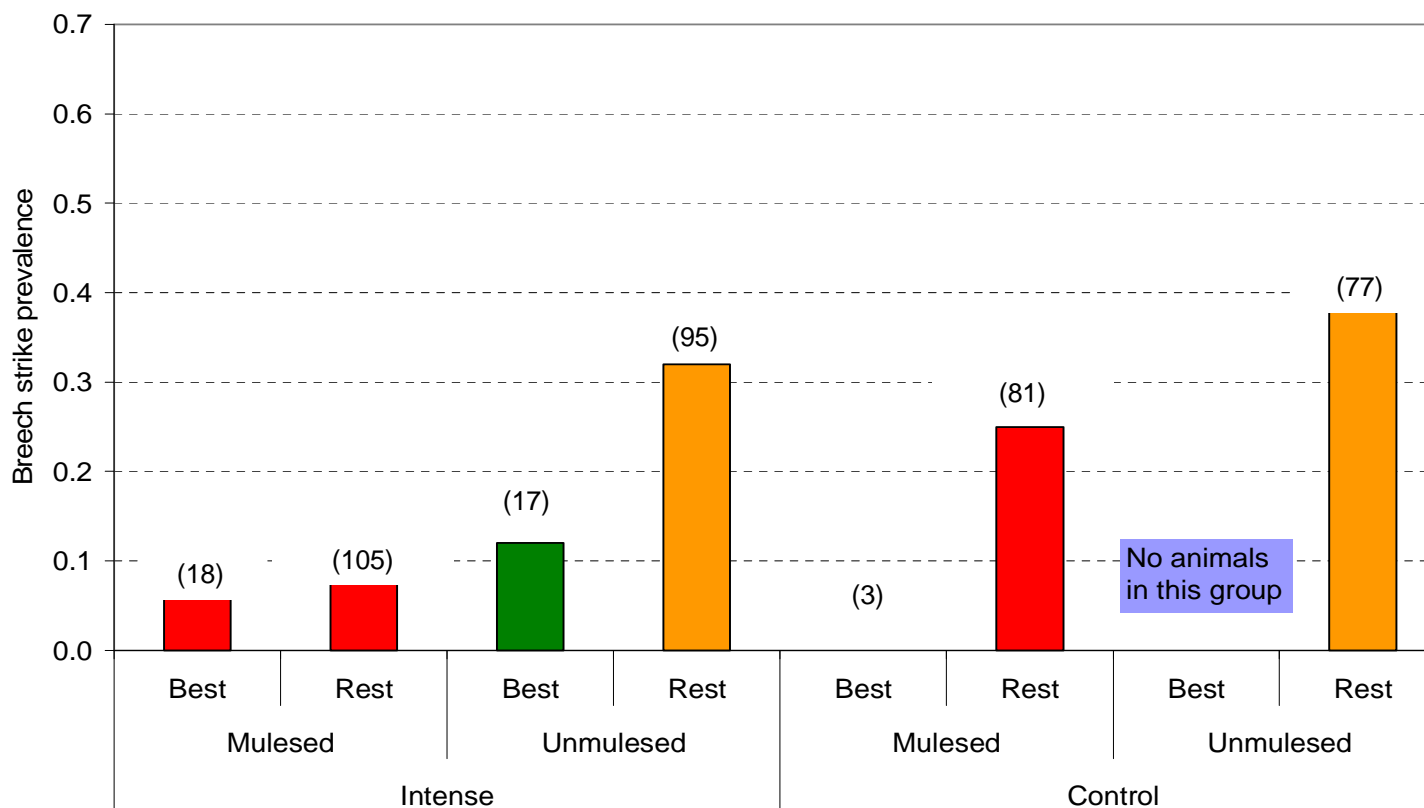
Hoggets (WA)

'Best' = $BRWR \leq 2$ AND $DAG \leq 2$ AND $BCOV \leq 3$

'Rest' = $BRWR \geq 3$ AND/OR $DAG \geq 3$ AND/OR $BCOV \geq 4$

Incidence of breech strike in The 'best' *versus* the 'rest'

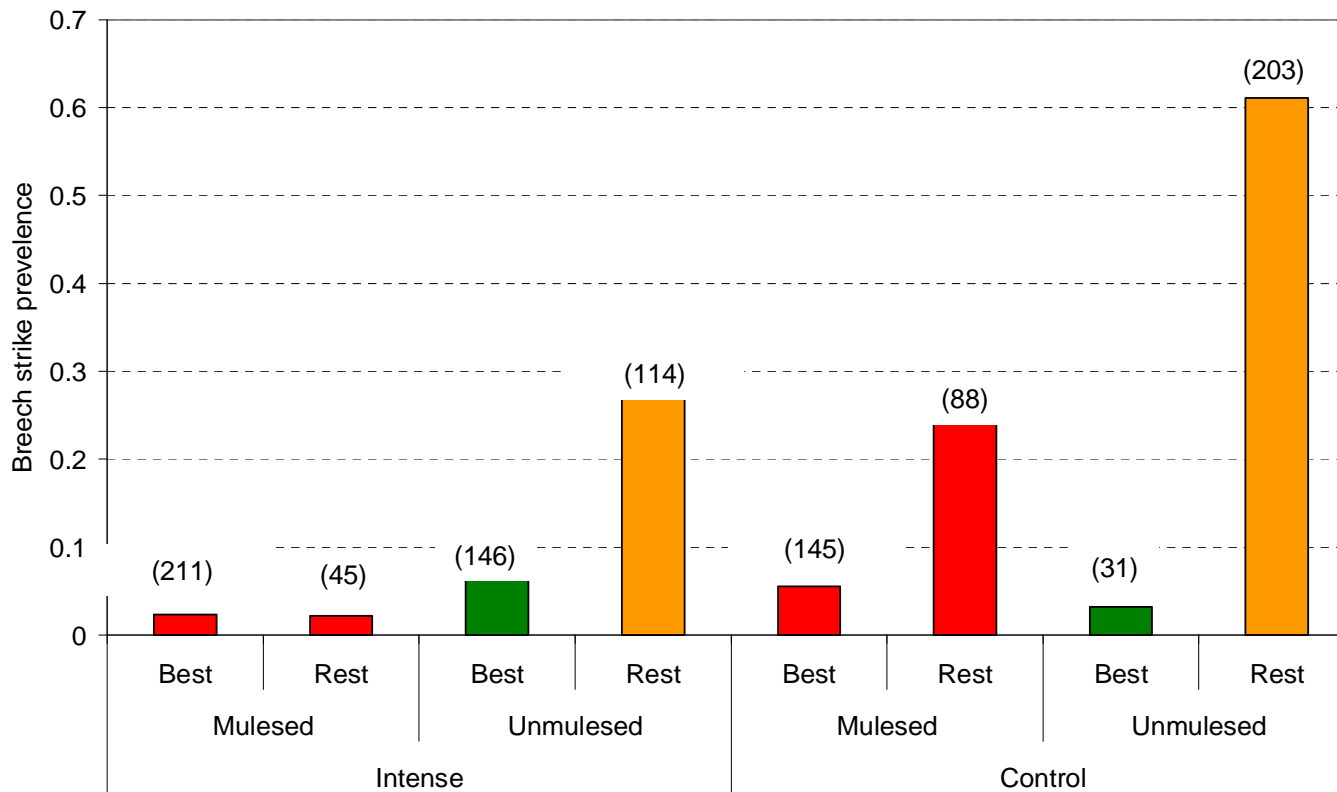
Mt Barker DAFWA - Hoggets 2006 & 2007 drop
(classifications based on hogget age breech traits)



(Arithmetic means; numbers in parentheses indicate number of animals in that category)

Incidence of breech strike in the 'best' versus the 'rest'

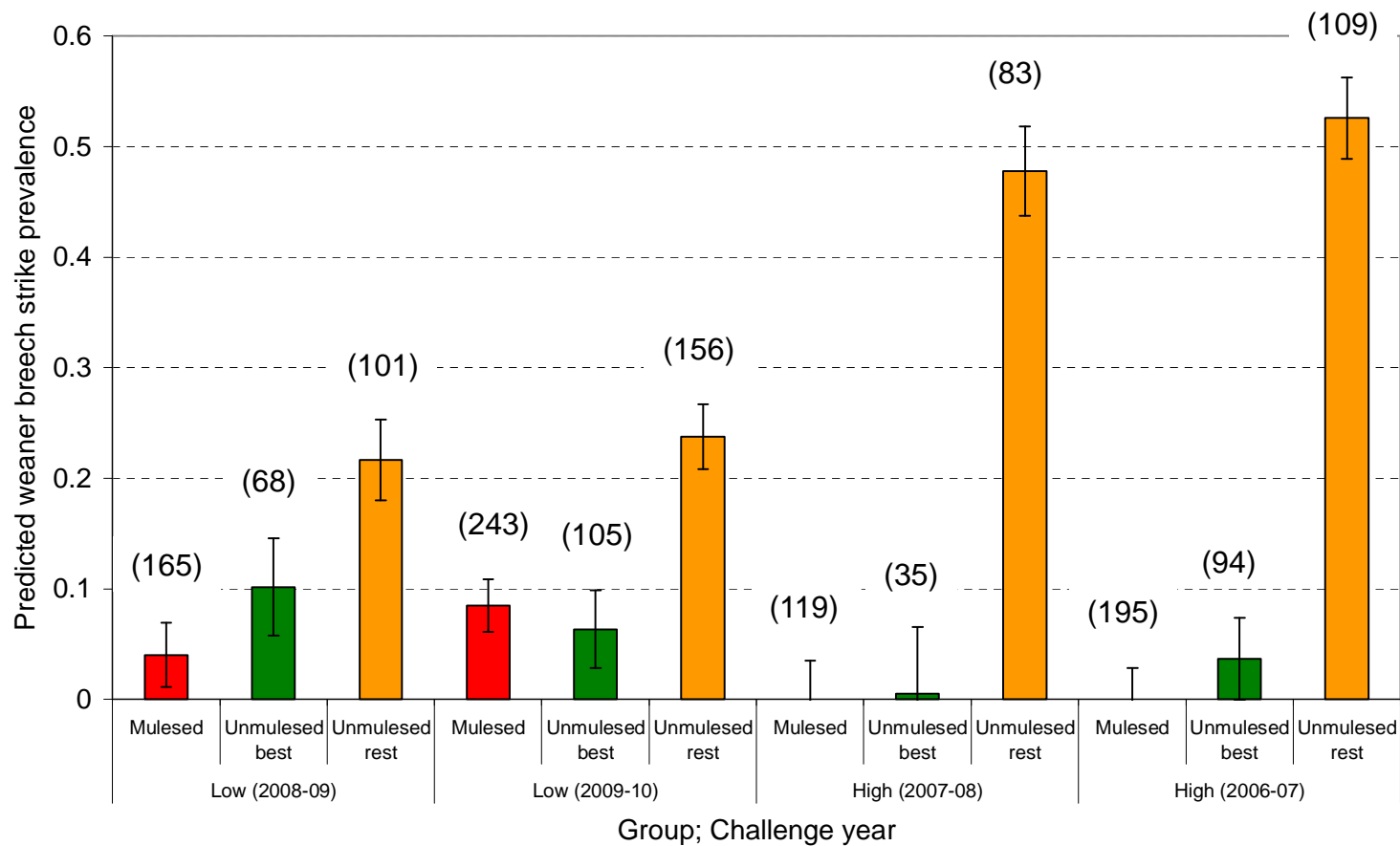
Armidale CSIRO - Weaners 2006-2009 drop
(classifications based on post-weaner age breech traits)



(Arithmetic means; numbers in parentheses indicate number of animals in that category)

Incidence of Breech Strike

Armidale season affects 'impact' on susceptible phenotype
Yearling breech strike rates in different seasons



*These seasonal effects have not been observed at Mt Barker WA
(Numbers in parentheses indicate number of animals in that category)*

Incidence of breech strike in The 'best' *versus* the 'rest'

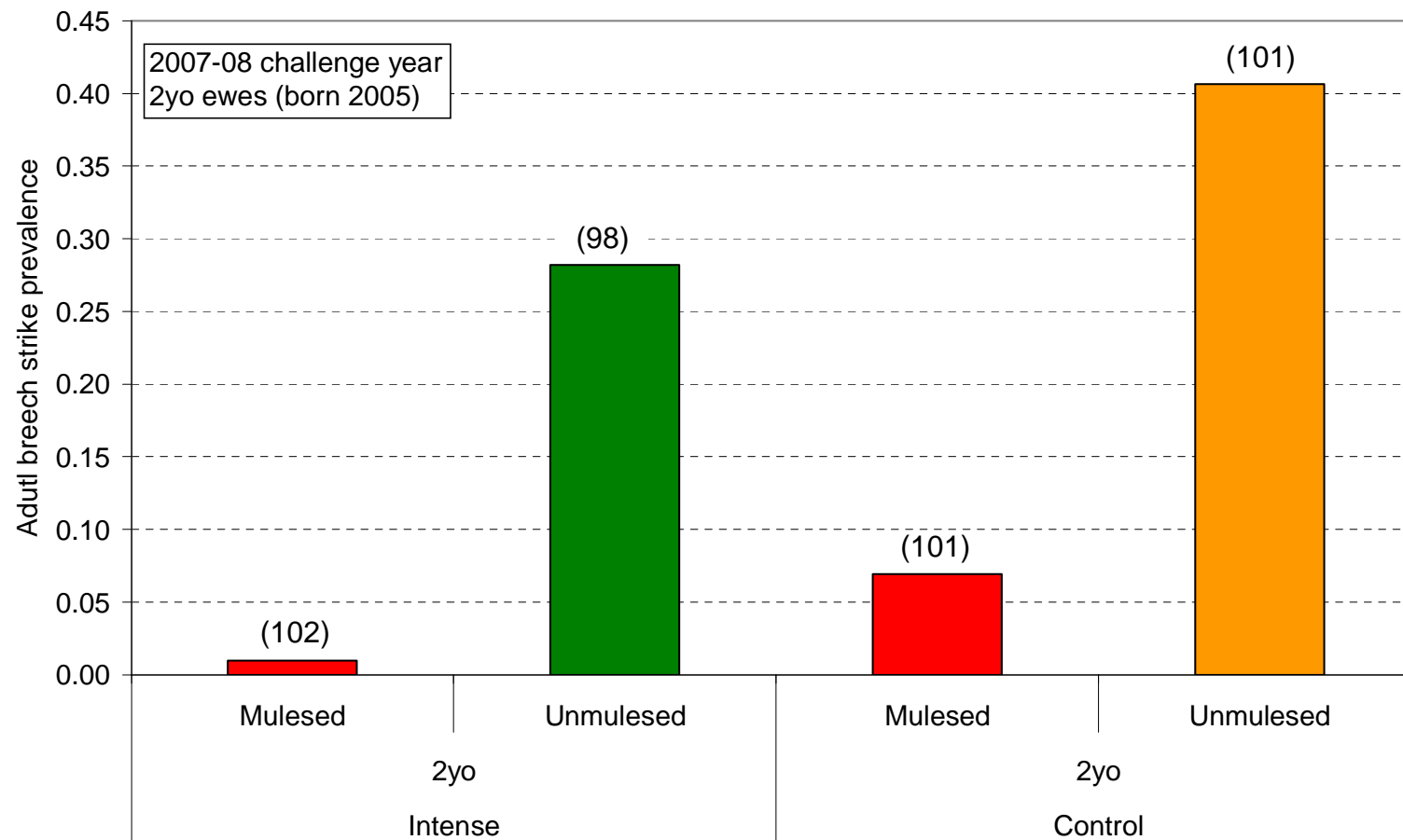
There is not yet enough data across years and across the 'best' and the 'rest' categories for each of the selection lines for Breeding Ewes.

With the 2 year extension of the project there will be enough data by 2012.

Breeding ewe comparisons that follow are within selection lines only.

Incidence of breech strike in breeding ewes, Armidale

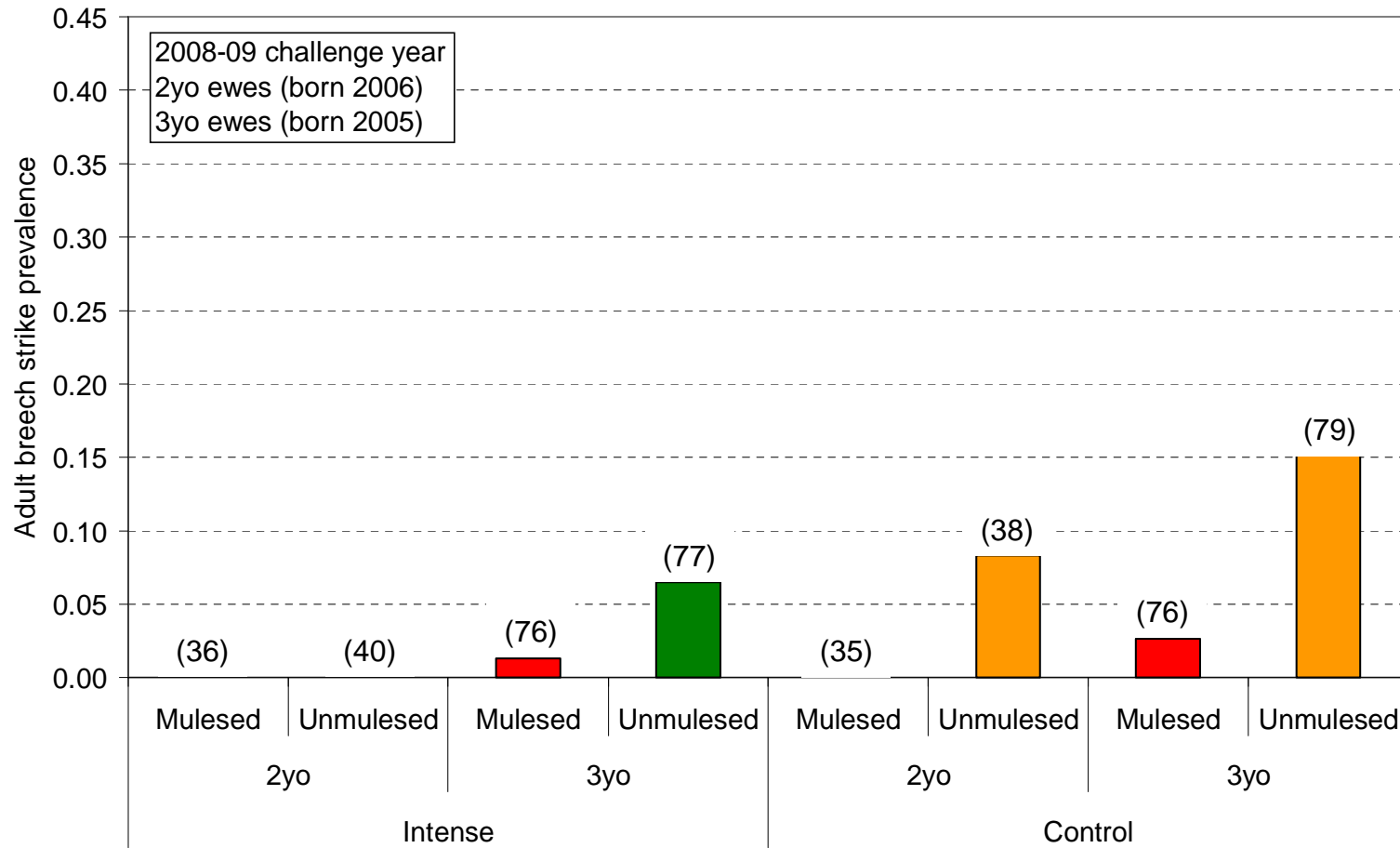
2007-08 - High challenge year



(Arithmetic means; numbers in parentheses indicate number of animals in that category)

Incidence of breech strike in breeding ewes, Armidale

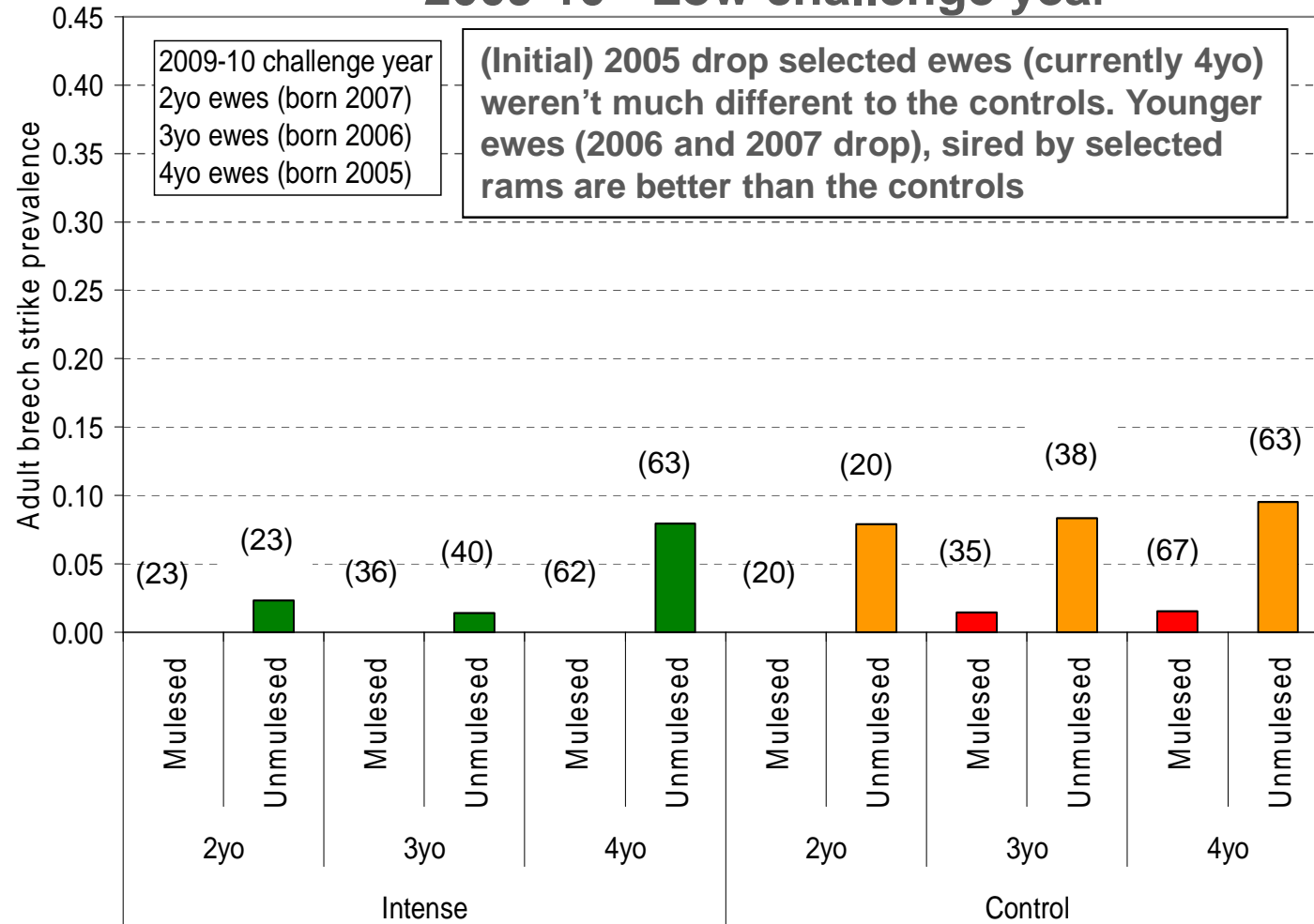
2008-09 - Low challenge year



(Arithmetic means; numbers in parentheses indicate number of animals in that category)

Incidence of breech strike in breeding ewes, Armidale

2009-10 - Low challenge year

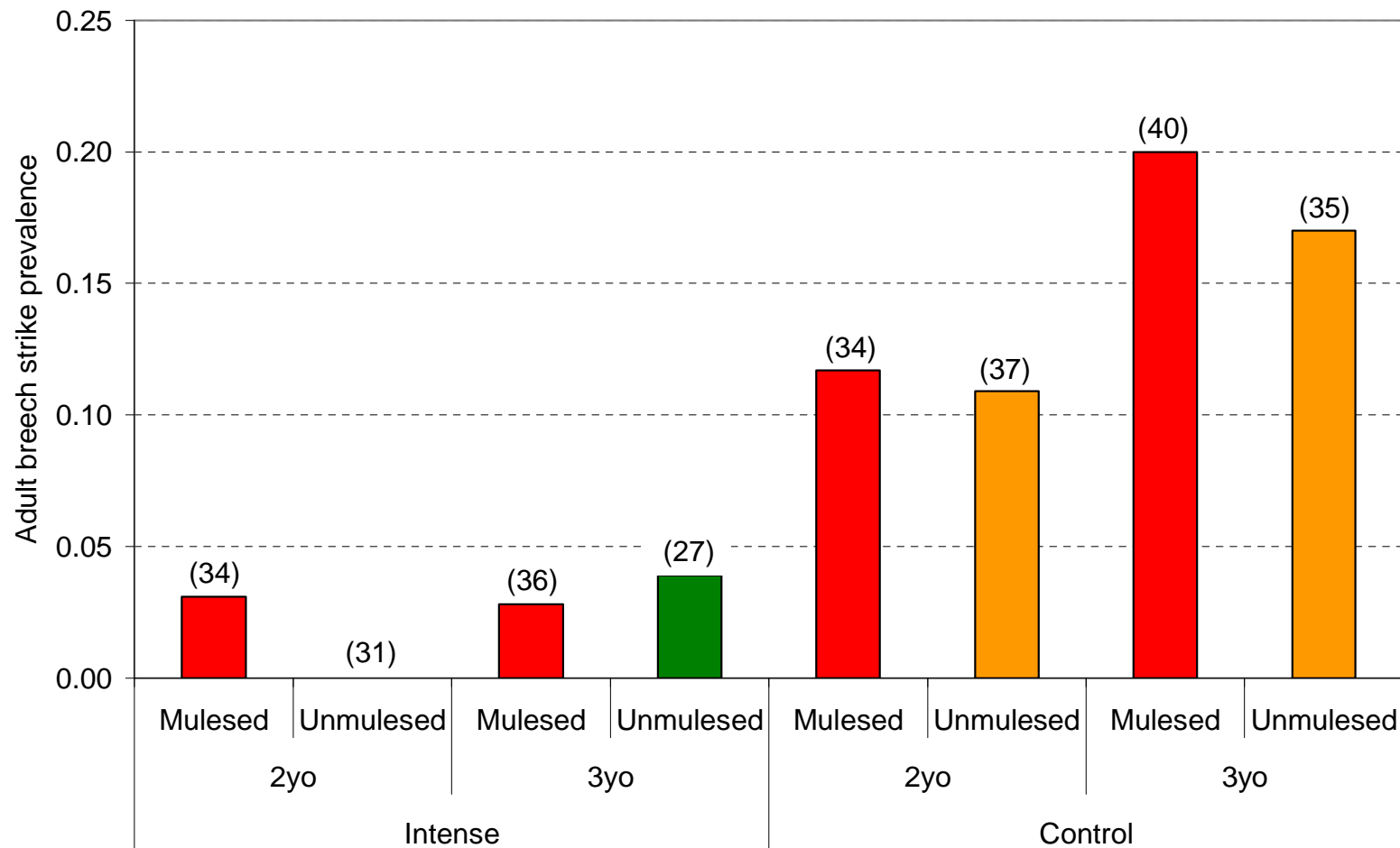


2009-10 challenge year
 2yo ewes (born 2007)
 3yo ewes (born 2006)
 4yo ewes (born 2005)

(Initial) 2005 drop selected ewes (currently 4yo) weren't much different to the controls. Younger ewes (2006 and 2007 drop), sired by selected rams are better than the controls

(Arithmetic means; numbers in parentheses indicate number of animals in that category)

Incidence of breech strike in breeding ewes between selection lines, Mt Barker, 2008



Ewes crutched at 6 months

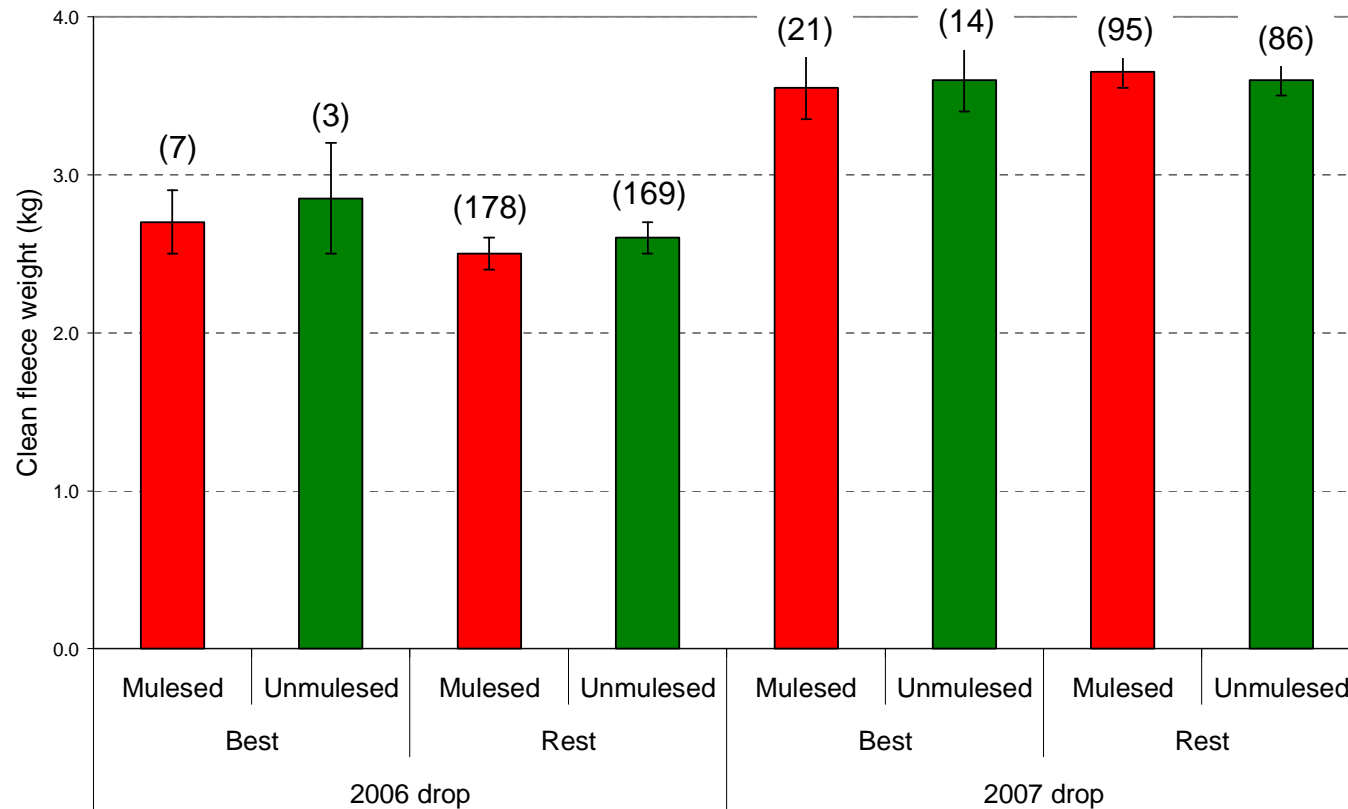
(Arithmetic means; numbers in parentheses indicate number of animals in that category)

Best *versus* Rest comparing young sheep fleece weight and fibre diameter

- Mt Barker - limited differences between selection lines or BEST and REST categories in fleece traits
- Armidale - there are some differences between BEST and REST categories in fleece traits
 - Some are good, some are not
 - So, requires a balanced approach
- In following slides ASBV information compares site average ASBVs with MERINOSELECT Stud average ASBVs

Fleece weight, Mt Barker

Clean fleece weight, hoggets born in 2006 and 2007 (12 months growth), best versus rest



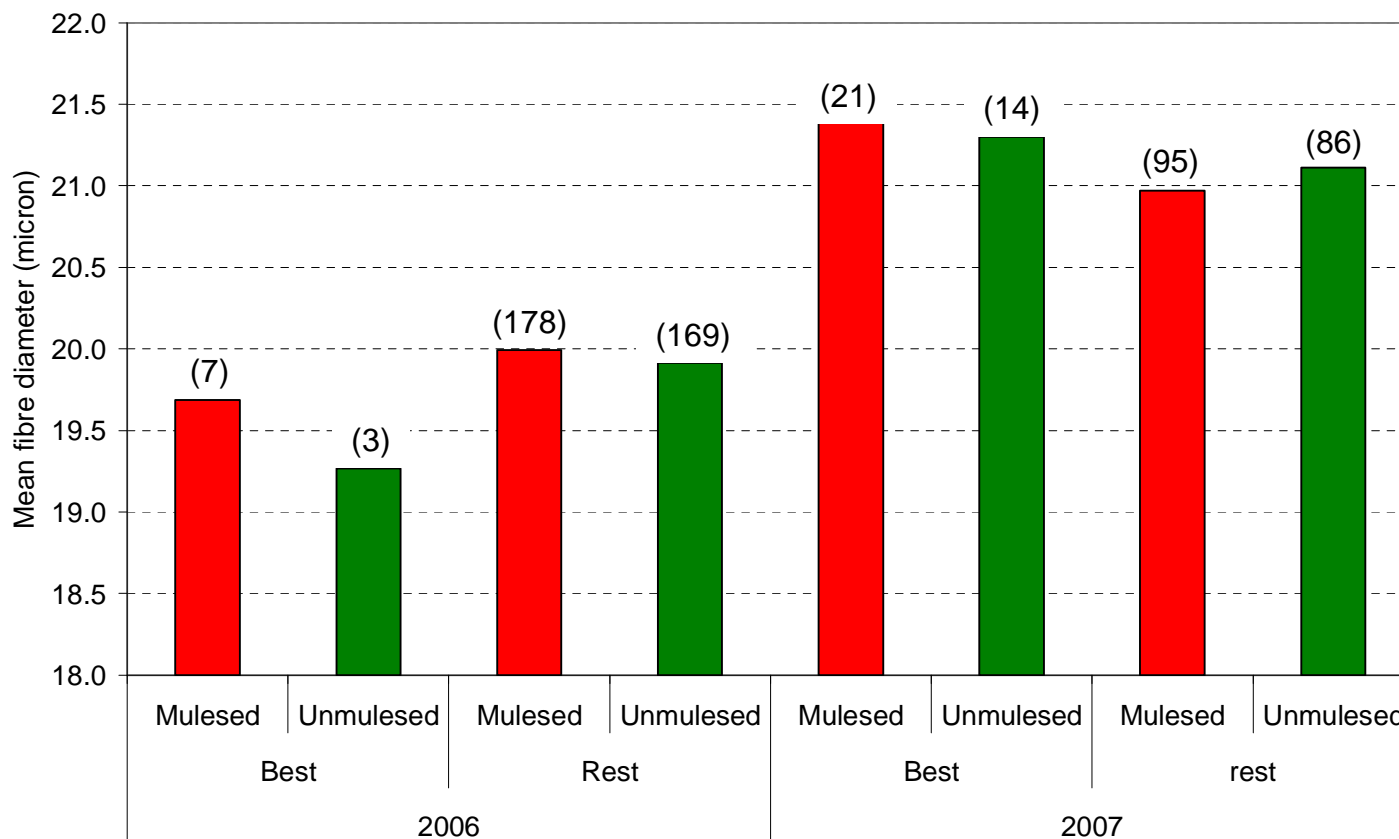
5yr average yCFW ASBV (Aug 2010)
 Mt Barker = +4.5%
 Medium/Strong Merinos = +3.6%

Best = Wrinkles ≤ 2 ; Dags ≤ 2; Breech cover < 3
 Rest > Wrinkles > 2 ; Dags > 2; Breech cover ≥ 3

Numbers in parentheses indicate number of animals in that category

Fibre diameter, Mt Barker

Mean fibre diameter, hoggets born in 2006 and 2007 (12 months growth), best versus rest



Best = Wrinkles ≤ 2 ; Dags ≤ 2 ; Breech cover < 3

Rest > Wrinkles > 2 ; Dags > 2 ; Breech cover ≥ 3

Note: low numbers in 'Best' (< 20)

Numbers in parentheses indicate number of animals in that category

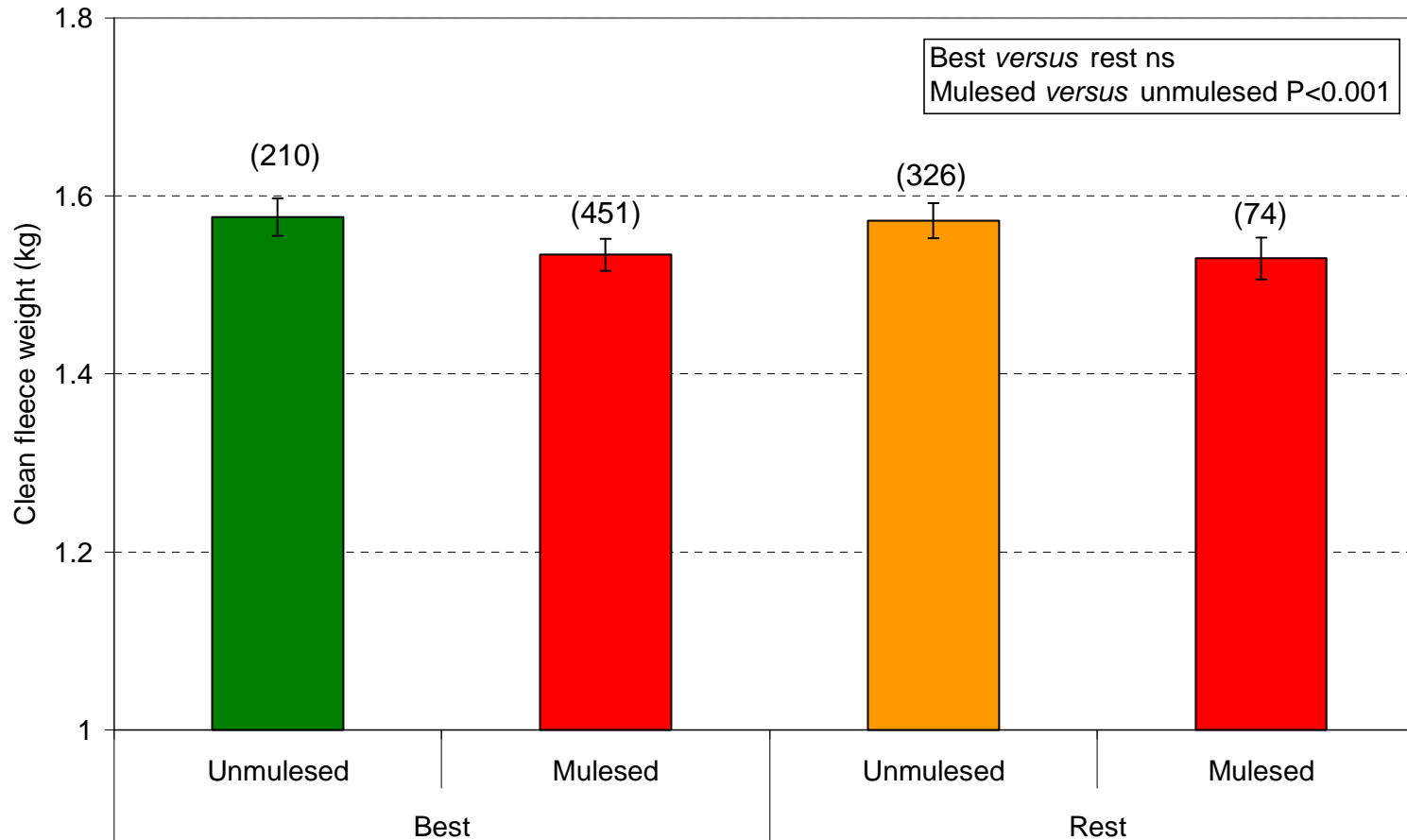
5yr average yFD ASBV (Aug 2010)

Mt Barker = -0.2mic

Medium/Strong Merinos = -0.4mic

Fleece weight, Armidale

Clean fleece weight, yearlings born in 2005-2008 (11 months growth), best versus rest



Best = Wrinkles ≤ 2 ; Dags ≤ 2

Rest = Wrinkles > 2 AND/OR Dags > 2

Numbers in parentheses indicate number of animals in that category

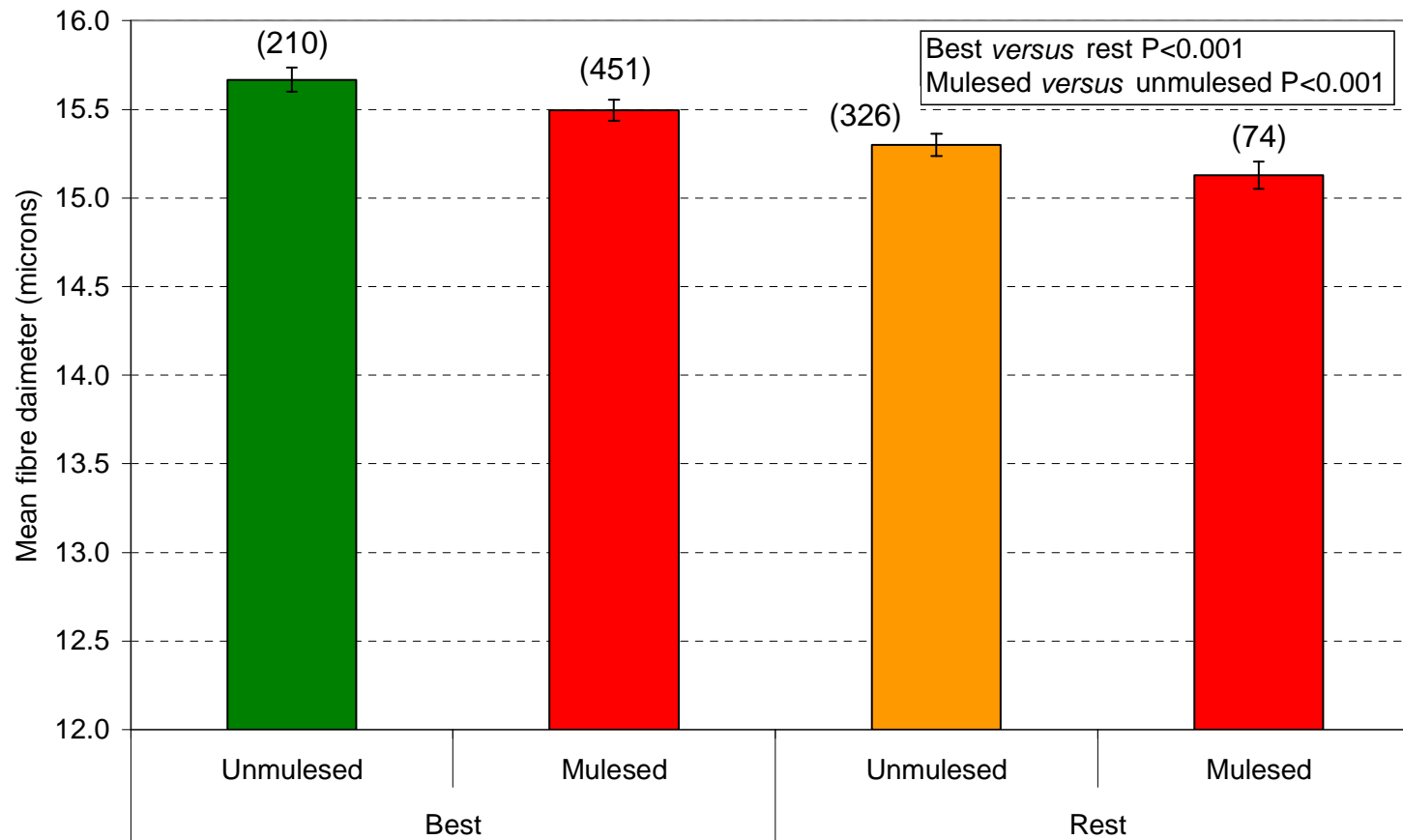
5yr average yCFW ASBV (Aug 2010)

Armidale = -10%

Ultra/superfine Merinos = -8%

Fibre diameter, Armidale

Mean fibre diameter, yearlings born in 2005-2008 (11 months growth), best versus rest



Best = Wrinkles ≤ 2 ; Dags ≤ 2

Rest = Wrinkles > 2 AND/OR Dags > 2

Numbers in parentheses indicate number of animals in that category

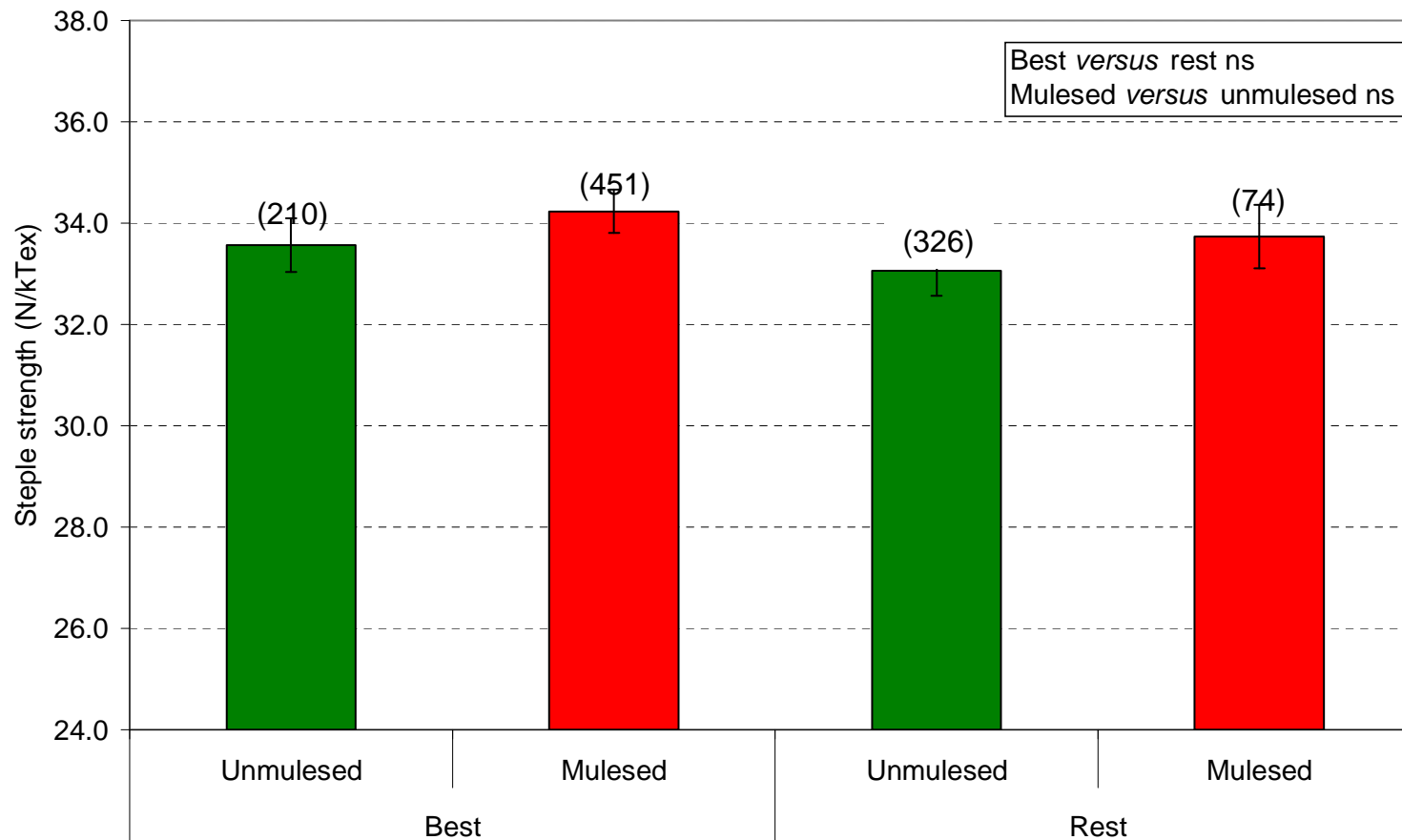
5yr average yFD ASBV (Aug 2010)

Armidale = -1.6mic

Ultra/superfine Merinos = -2.1mic

Staple strength, Armidale

Staple strength, yearlings born in 2005-2008 (11 months growth), best versus rest



Best = Wrinkles ≤ 2 ; Dags ≤ 2

Rest = Wrinkles > 2 AND/OR Dags > 2

Numbers in parentheses indicate number of animals in that category

5yr average ySS ASBV (Aug 2010)

Armidale = +3.3N/kTex

Ultra/superfine Merinos = +0.1N/kTex

Summary

- 5 years is not very long in sheep breeding terms, but we have seen really promising responses and outcomes in this Project
- Results at 2 sites between 2006 and 2009 suggest that flystrike risk can be successfully managed in low wrinkle sheep in low dag zones without mulesing
- Incidence of dags is strongly influenced by climatic conditions, breeding will take much longer in these regions
- Results validate the anecdotal low risk and rates of flystrike expressed by growers who have successfully ceased mulesing
- Results validate the anecdotal high risk and rates of flystrike expressed by growers who have unsuccessfully ceased mulesing with sheep that are in “the rest category”

Summary

The initial Project has finished, but further breeding R&D work continues;

- More detailed phenotyping of ‘extremes’
- Looking for ‘new’ indicators
- SNP profiles (DNA testing)
- Improving standard errors and accuracy with additional records across more years
- Some sheep in the “best” category are susceptible to flystrike, some sheep in the “rest” category are resistant to flystrike – Why?
- On going R&D with dags is needed, the hard issue to crack



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