

PRESENTATION AT ADELAIDE DOHNE COUNCIL F2F FEB 2018

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ACCURACY ANALYSIS FOR OBJECTIVE SHOW JUDGING



TOPICS

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2. MEASUREMENT SYSTEMS COMPARED

3. DATA RESULTS FOR WEAN WEIGHT & NUMBERS

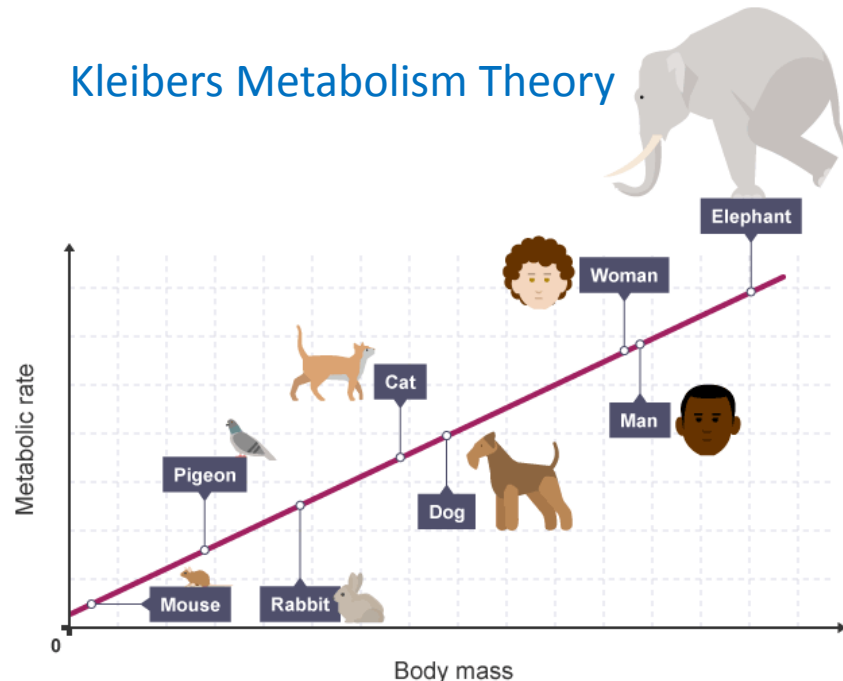
4. OTHER SHOW ISSUES

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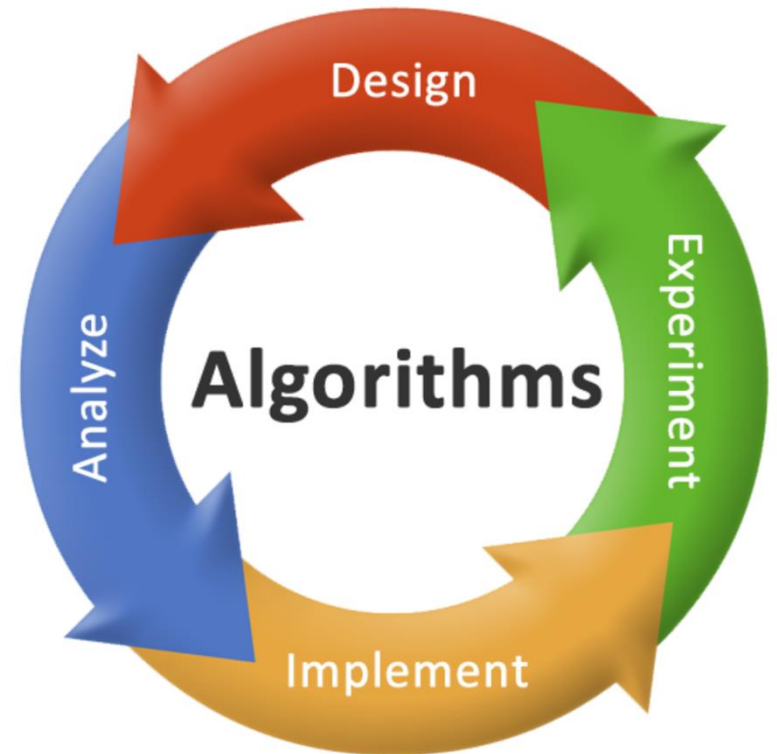
ABSTRACT – Theory's

- Kleibers Metabolism Theory says that bigger animals have a lower metabolism per unit weight by a factor of 75%.
- It is often assumed that this supports increased size efficiency and so for this presentation I introduce two approximates to level this claim.
- The Rogerson Production Approximate says for every 10-fold decrease in size conversion efficiency doubles in grazing mammals.
- The Rogerson Reproduction Approximate says for every 10-fold decrease in size fecundity doubles in grazing mammals.
- This means that a 600kg cow has 75% of the metabolic cost per kilo as a 60kg ewe, but twice the feed conversion cost of 8-1 against 4-1 and half the fecundity rate with 1 per year against 1.3 every 8 months.



ABSTRACT – Algorithms

- An algorithm is the guiding rule of the calculation.
- An index compares value over time.
- The OVIS algorithm is a calculation with complete linkage of progeny's record to progeny co-relatives, trait co-relatives, flock and year co-relatives and genomics co-relatives, involving thousands of calculations for each individual.
- The Stirling Accrued algorithm is a calculation complete with index, but only 1 dam linkage which influence diminishes yearly as the progeny proofs her own figures.



Stirling Birth Records Accuracy levels

- Remember Stirling has run a whole stud grain ban since 2009.
- Below is a list of Stirling Dohne 2017 birth records procedure.

SCANNING

- 289 ewes joined and scanned 1,2 and 3.
- 36 [12.5%] scanned dry.
- 103 [35.5%] scanned single
- 138 [48%] scanned twin
- 12 [4%] scanned triple.
- 415 [144%] total lambs scanned.

DAY OF BIRTH TAGGING

- 336 [116%] tagged; live at birth.
- 25 [9%] not tagged; dead at birth
- 36 [12.5%] missing presumed aborted
- 3 [1%] presumed aborted not correctly reported
- 4 [1%] wet ewes with no record
- 10 [3.5%] dead ewes [5 twin scan]
- 1 [1%] no record.
- 415 [144%] total

35 DAY MARKING

- 296 [102%] tagged at birth lambs marked
- 40 [14%] tagged at birth lambs missing presumed dead.

100 DAY WEANING

- 286 [99%] lambs weaned
- 10 [3%] lambs missing presumed dead.

- As can be see the difference between scanning and day-of-birth recording is 28%.
- The difference between scanning and 35 day marking [6-week mothering] is 42%.
- My last 5 years of records contain the same accuracy levels if required.

MEASUREMENT SYSTEMS USED

- Actuals – Dam Wean Weight, Progeny Wean Weight, 2017 NLW, Lifetime NLW.
- Genotypic, ASBA, OVIS, (traits) NLW, MWWT, WWT.
- Phenotypic – Meat Production Percentage, yearly daily wean ratio; lifetime (Stirling Accrued) daily wean ratio.

Daily Wean Ratio is the weight of ewe divided by the weight of lamb at weaning and adjusted to 100 days. At Stirling this is also accrued from season to season as a multi-year figure and from generation to generation as a single year figure to become Accrued Daily Wean Ratio.

PHENOTYPIC MEAT PRODUCTION PERCENTAGE IN AMERICAN CATTLE INDUSTRY.

(205 day Wean Ratio Standard)

- Performance records of 169, 5 to 9 years cows at North Dakota State University divided into 5 weight groups.

Table 1. Percentage of cow weight weaned.

Weight Range (lb)	Number of Records	Avg. Cow BW at Weaning	Avg. Calf Weaning BW	% of Cow BW Weaned
≤ 1300	37	1242	617	50
1301 – 1400	39	1357	611	45
1401 – 1500	38	1456	589	41
1501- 1600	33	1549	598	39
>1600	22	1698	572	34

- Lightest have the best wean ratio.
- Lightest rear the heaviest calves.

PHENOTYPIC MEAT PRODUCTION PERCENTAGE IN AMERICAN CATTLE INDUSTRY.

(205 day Wean Ratio Standard)

- Performance records of 438 mature cows at University of Georgia divided into 9 weight groups

Table 3. Summary of production of 438 mature cows.

Cow BW, lb	Number of Cows	Calf Weaning BW, % of Cow BW
900	4	53.0
1000	42	51.5
1100	53	49.0
1200	56	46.5
1300	94	45.0
1400	94	42.0
1500	68	39.0
1600	23	37.0
1700	4	34.0

- Lightest cows have the best Wean Ratios closely reflecting Table 1.

DATA RESULTS – ACCURACY LEVELS

- Table A (Below) – 2017 Analysis for complete Stirling Dohne Stud Ewe Flock of 196 weaned wet dams in 5 Stirling accrued categories.

Table A	1	2	3	4	5	6	7	8	9	10	11	12	13
	IDENTITY			ACTUAL					WEAN RATIO		ASBV		
GROUPS	No of Dams	% Maidens	Stirling Accrued Category	2017 Dam Wean Wt	2017 Lamb Wean Wt	2017 Total Wean Wt	2017 Lamb Wean No.	Lifetime Wean No.	2017 Wean Ratio	Lifetime Wean Ratio	WWT % ILE	MWWT % ILE	NLW % ILE
1	38	29%	0.92, 0.69	55.1	24.4	42.4	1.74	1.68	0.77	0.75	54	41	43
2	38	24%	0.68, 0.61	58.8	22	34.8	1.58	1.45	0.59	0.65	66	51	32
3	38	37%	0.60, 0.55	59.1	23.8	33.1	1.39	1.34	0.56	0.57	62	60	46
4	37	14%	0.54, 0.50	63.4	26.6	33	1.24	1.15	0.49	0.52	53	48	59
5	45	29%	0.49, 0.35	68.4	26.2	28	1.07	1.07	0.41	0.44	63	61	68

Table (A) Analysis

- Yearly actual and wean ratio figures (7 & 9) strongly reflect corresponding lifetime figures (8 & 10) in the group situation indicating co-relative between the 2.
- Body weight (4) inversely proportional to all weight and No. actuals and wean ratios except column (5).
- Body weight (4) has little relationship with ASBV's.

DATA RESULTS – ACCURACY LEVELS

- Table B (Below) – 2017 Analysis for complete Stirling Dohne Stud Ewe Flock.
- Table A analysis with only scanned singles retained in the same groups.

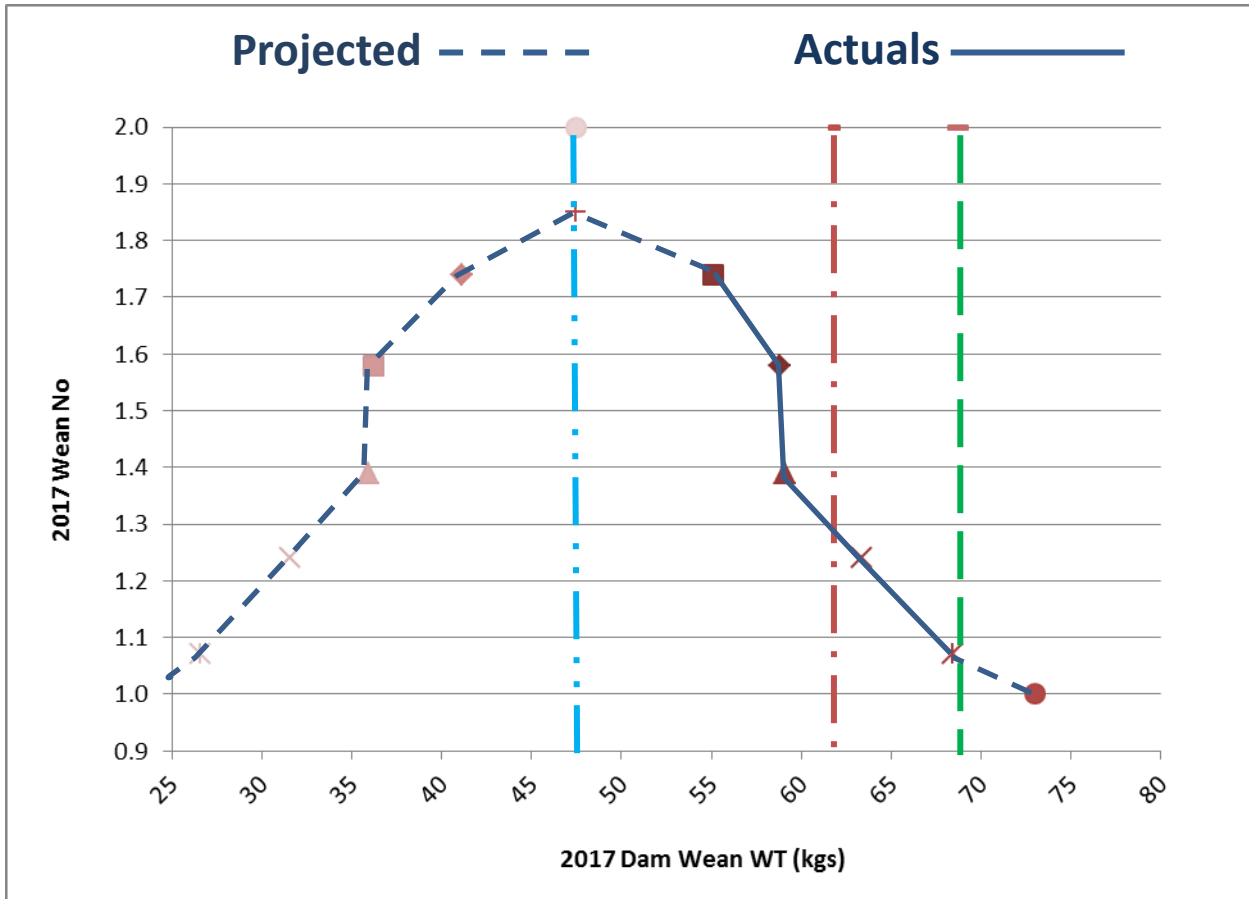
Table B	1	2	3	4	5	6	7	8	9	10	11	12
	IDENTITY			ACTUAL				WEAN RATIO		ASBV		
GROUPS	No of Dams	% Maidens	Stirling Accrued Category	Average Dam Wt	2017 Wean Wt	2017 Wean No.	Lifetime Wean No.	2017 Wean Ratio	Lifetime Wean	WWT % ILE	MWWT % ILE	NLW % ILE
1	10	23%	0.92, 0.69	57.9	30.6	1	1.36	0.54	0.72	55	5	74
2	13	32%	0.68, 0.61	60.8	28.6	1	1.1	0.48	0.64	65	35	59
3	9	40%	0.60, 0.55	63.8	31.2	1	1	0.49	0.57	67	10	74
4	14	22%	0.54, 0.49	66.3	28.2	1	1.1	0.43	0.51	53	35	82
5	16	24%	0.48, 0.35	71.1	28.6	1	1	0.40	0.43	67	58	80

Table (B) Analysis

- Small sample numbers test accuracy levels.
- Dam weight (4) inversely proportional to actuals and wean ratios.
- ASBV, WWT & NLW have no relationship with respective actuals, but MWWT has small amount.
- Species optimal production weight is beginning to flat line suggesting average weight will be above 50kg assuming adequate sample numbers.

BELL CURVATURE

- Table A – 2017 Analysis for complete Stirling Dohne Stud Ewe Flock.
- Bell Curvature for columns 4 & 7 on Table A.



Projected Optimal Species Reproductive Average WT 47.5kgs. — · — · —

2017 Stirling Dams Average WT 61.6kgs. - . - . -

2012 Stirling Dams Average WT 68.7kgs. - - - -

Table A figures

4	7
ACTUAL	
2017 Dam Wean Wt	2017 Lamb Wean No.
55.1	1.74
58.8	1.58
59.1	1.39
63.4	1.24
68.4	1.07

Species optimal reproduction rate has not yet been reached with wean No. bell curve not even beginning to flat line which may begin at wean No. 2 when triplets and lighter bodyweight will clash with environment possibly around 47.5kgs which will establish species optimal reproduction weight.

GROUP ACCURACY LEVELS

ASBV NLW IN 10 PERCENTILE GROUPS VERSES ACTUAL LIFETIME N.L.W. AND CROSS CHECKED.

- 2017 Analysis for complete Stirling Dohne Stud Ewe Flock.

Table C			
ASBV NLW % ILE	ACTUAL LIFETIME NLW	ACTUAL LIFETIME NLW	ASBV NLW % ILE
(0-10)	1.67	1.00	76
(11-20)	1.43	1.14	88
(21-30)	1.38	1.20	40
(31-40)	1.49	1.25	55
(41-50)	1.41	1.33	68
(51-60)	1.33	1.40	36
(61-70)	1.18	1.50	49
(71-80)	1.20	1.57	40
(81-90)	1.24	1.66	55
(91-100)	1.11	1.83	6
		2.00	40

DATA RESULTS – ACCURACY LEVELS

- Individual accuracy levels in the studs 7 oldest ewes.

Table D

IDENTITY	Dam Wt KG	Lifetime Wean No.	2017 Wean Ratio	Lifetime Wean Ratio	WWT % ILE	MWWT % ILE	NLW % ILE	Index
ST080107	71	1.63	0.43	0.67	94	55	22	140.3
ST080117	58	1.57	0.74	0.67	93	80	37	123.7
ST070003	51.5	1.67	0.58	0.8	94	25	75	115.5
ST070136	73	1.43	0.26	0.42	94	92	10	128.3
UD081363	50	1.29	0.55	0.58	55	99	55	127.9
UD060316	48	1.5	0.7	0.66	87	60	1	146.6
UD051323	58	1.5	0.47	0.69	91	40	99	103.3

- ASBV inaccuracy levels are more pronounced individually than even at group levels.

DATA RESULTS – Consistency Levels

- Consistency – Comparing Figures of Recently use Sires and recording the largest percentile change.

Table E - TOM					
Analysis Date	WWT	MWWT	PWWT	YEMD	YCFW
Aug-14	2.4	1.3	2.9	0.9	14.1
Feb-17	4.1	0	5.2	1.4	10.6
Jan-18	3.9	-0.1	4.9	-0.1	17.3
	55%	80%	57%	77%	15%

Table G - HARRY					
Analysis Date	WWT	MWWT	PWWT	YEMD	YCFW
Sep-15	5.8	-0.7	8.2	-0.1	16.7
Feb-17	2.6	0.1	4.8	-0.2	14.7
Jan-18	2.8	1.2	3.1	0.1	8.4
	69%	84%	67%	10%	31%

Table F - DICK					
Analysis Date	WWT	MWWT	PWWT	YEMD	YCFW
Aug-14	1.9	-0.3	1.9	0.1	17.2
Feb-17	2.6	0.4	3	0.1	12.4
Jan-18	2.4	-0.8	2.6	-0.1	24.2
	17%	39%	20%	7%	11%

Table H - FRED					
Analysis Date	WWT	MWWT	PWWT	YEMD	YCFW
Sep-15	1.4	0.1		1.1	9.6
Aug-16	1.7	1.1		1.2	11.4
Jan-18	1.9	0.9	1.1	1.2	10.6
	6%	63%	-	7%	13%

DATA RESULTS – Consistency levels

STIRLING
M ROGERSON
51-0186

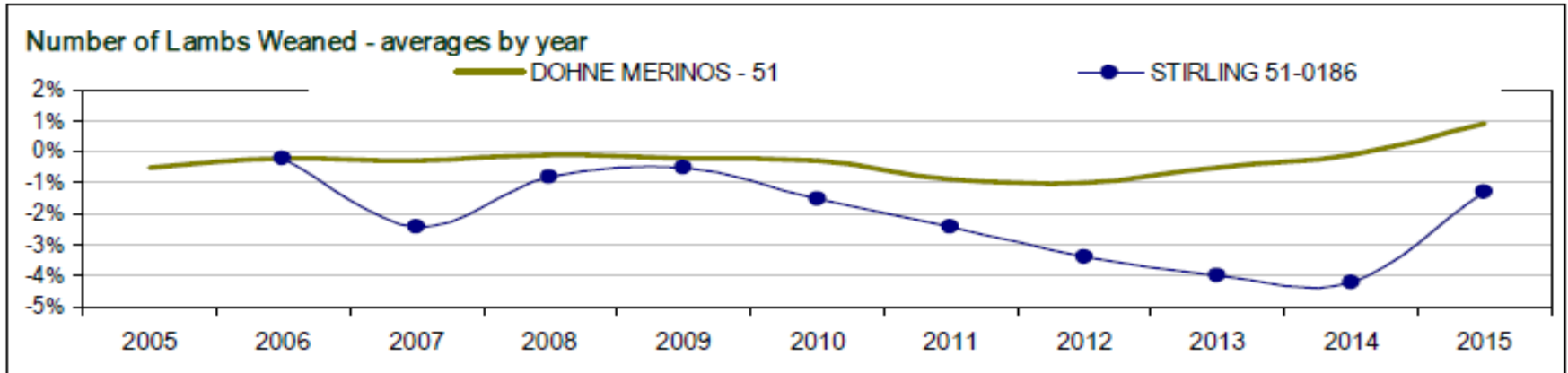
Analysis | DOHNE MERINOS

Dated : 21 Mar 16

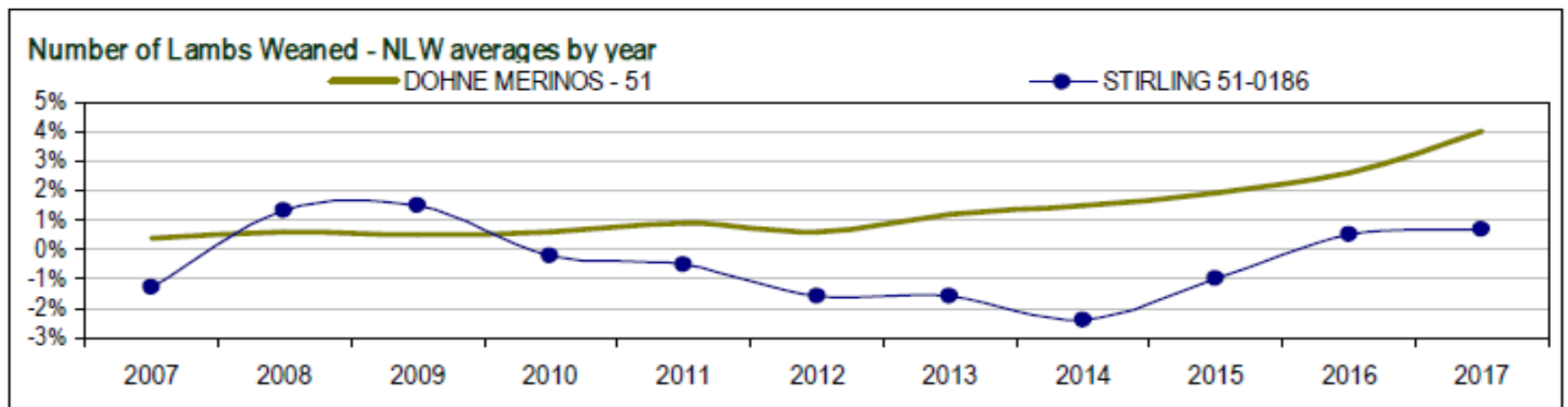
SHEEP GENETICS



21 Mar 2016



21 Jan 2018



Notices differences in table between years 2008 & 2009.

DATA RESULTS – Heritability Levels

- **Heritability** – Where is Stirling Dohne moving at this early stage.

	NLB	NLW
Av. of 19 Dohne Catalogues 2017	1.42	1.27
2017 Stirling Catalogue	1.76	1.56

	2012	2017
Av. Dam Wt	68.7kg	61.6kg
NLW	1.28	1.39

THINGS WE CAN DO

DAY OF BIRTH RECORDS

DAM	PROGENY	SEX	DOB	WEAN DATE	WEAN WT	DWG
UD120147	ST150089	Male	22/09/2015	20/12/2015	41Kgs	461Grams
UD121845	ST150074	Male	14/08/2015	20/12/2015	43.5Kgs	340Grams
DAM	PROGENY	SEX	DOB	WEAN DATE	WEAN WT	DWG
UD120147	ST150089	Male	2/09/2015	20/12/2015	41Kgs	376Grams
UD121845	ST150074	Male	2/09/2015	20/12/2015	43.5Kgs	399Grams

ST150089 IS DISCOUNTED 19%
 ST150074 IS INFLATED 17%
ST150074 ADVANTAGE 36%

1. ACTUALS WITH BIRTH AVERAGING WILL CULL TOP LAMBS.
2. WEAN RATIO AND ASBV'S WILL HAVE A SIMILAR PROBLEM.

TWIN LAMB SYNDROME

Description	IDENTITY	Dec-15	Feb-16	Percentile	Jun-16	Jun-16	Aug-16	Percentile
		Wean Wt	ASBV YCFW		250Day WT	Wool WT	ASBV YCFW	
DAM	UD071409		15.5%				16.7%	
PROGENY	ST150014	29Kgs	12.8%	10.5	60.5kg	4.5kg	22.4%	0.5
PROGENY	ST150020	23Kgs	11.8%	13.5	51.5kg	3.9kg	11.9%	13
DIFFERENCE		21%		3%ILE	15%	13%		12.5%ILE

- By February 2016 with only one measurement entry, that of Wean Weight, ST150020's ASBV YCFW has already been discounted by 3 percentile, meaning that the O.V.I.S, Algorithm is incorporating the Wean Weight trait into the YCFW trait before indexing. YCFW is no longer a trait, it is an index.
- By separating the entry dates of the June Body and Wool weights we could ascertain whether the PWWT trait is also influencing the YCFW trait causing yet further deterioration of the trait's value.
- If I were the AWI, I would also withdraw funding until this basic flaw is corrected.



OTHER SHOW ISSUES - WOOL

- No Wool Production Percentage figures available but they will be available this time next year to compare.
- Anecdotally YCFW has become as inaccurate as NLW since changing to 250 day measurement for quantity but still retains quality accuracy.
- Lower age measurements brings growth rate influence into what should be purely a wool trait. i.e indexed before indexing
- WPP may sought most of this problem even at 250 days.



OTHER SHOW ISSUES - ADULT WEIGHT

Percentile Report

Analysis **DOHNE MERINOS** Dated 07-Oct-17



Animals born in **2016** Count **16394**

Band	Bwt kg	Wwt kg	Mwwt kg	Pwwt kg	Pfat mm	Pemd mm	Ywt kg	Yfat mm	Yemd mm	Ycfw %	Ygfw %	Yfd u	Yfdcv %	Pfec %	NLW %	Psc cm	Dohne Plus	Dohne Base
0	-0.16	8.1	2.5	8.7	1.5	3.4	11.4	1.7	3.9	34	37	-2.9	-3.0	-27	19	3.5	192.1	187.4
1	0.03	5.9	1.9	7.1	0.8	2.0	8.4	1.0	2.3	19	18	-1.6	-2.1	-23	14	2.3	172.8	168.1
2	0.06	5.6	1.8	6.6	0.7	1.8	7.9	0.9	2.1	17	16	-1.4	-1.9	-22	13	2.2	169.0	164.9
3	0.08	5.4	1.7	6.4	0.7	1.7	7.6	0.8	2.0	16	15	-1.3	-1.8	-20	12	2.1	166.7	162.8
4	0.09	5.2	1.6	6.2	0.6	1.6	7.4	0.8	1.9	15	15	-1.3	-1.8	-19	12	2.0	164.9	161.3
5	0.10	5.0	1.5	6.1	0.6	1.5	7.2	0.7	1.8	15	14	-1.2	-1.7	-19	11	1.9	163.5	160.3
10	0.14	4.6	1.3	5.5	0.5	1.3	6.5	0.6	1.6	13	12	-1.0	-1.5	-9	9	1.7	158.6	155.7
15	0.16	4.4	1.2	5.2	0.4	1.1	6.1	0.5	1.4	11	10	-0.9	-1.3	-6	8	1.6	154.9	152.5
20	0.18	4.1	1.0	4.9	0.4	1.0	5.8	0.5	1.3	10	9	-0.8	-1.2	1	7	1.5	152.3	150.0
25	0.20	3.9	1.0	4.7	0.3	0.9	5.5	0.4	1.1	10	9	-0.7	-1.1	4	7	1.4	149.9	147.7
30	0.21	3.8	0.9	4.5	0.3	0.8	5.3	0.4	1.1	9	8	-0.6	-1.0	7	6	1.3	147.8	145.8
35	0.23	3.6	0.8	4.3	0.2	0.8	5.1	0.3	1.0	8	7	-0.5	-0.9	12	5	1.3	145.8	144.0
40	0.24	3.5	0.7	4.1	0.2	0.7	4.8	0.3	0.9	7	6	-0.4	-0.8	14	5	1.2	144.0	142.3
45	0.25	3.3	0.6	3.9	0.2	0.6	4.6	0.2	0.8	7	6	-0.4	-0.7	18	4	1.1	142.1	140.7
50	0.27	3.2	0.6	3.7	0.1	0.6	4.4	0.2	0.7	6	5	-0.3	-0.6	20	4	1.1	140.4	139.1
55	0.28	3.0	0.5	3.5	0.1	0.5	4.2	0.2	0.7	6	4	-0.3	-0.5	22	3	1.0	138.6	137.6
60	0.29	2.9	0.4	3.4	0.1	0.5	4.0	0.1	0.6	5	4	-0.2	-0.5	25	2	1.0	136.8	136.0
65	0.30	2.8	0.3	3.2	0.0	0.4	3.8	0.1	0.5	4	3	-0.1	-0.4	27	2	0.9	134.8	134.2
70	0.32	2.6	0.3	3.0	0.0	0.3	3.5	0.0	0.4	4	3	0.0	-0.3	28	1	0.8	132.8	132.4
75	0.33	2.4	0.2	2.8	0.0	0.2	3.3	0.0	0.3	3	2	0.0	-0.2	30	0	0.7	130.6	130.4
80	0.35	2.2	0.1	2.6	-0.1	0.2	3.0	-0.1	0.3	2	1	0.1	0.0	32	-1	0.7	128.0	128.1
85	0.37	2.0	0.0	2.3	-0.1	0.1	2.7	-0.1	0.1	1	0	0.3	0.1	33	-2	0.6	125.0	125.3
90	0.39	1.8	-0.1	1.9	-0.2	-0.1	2.2	-0.2	0.0	0	-1	0.4	0.3	36	-3	0.4	121.0	121.8
95	0.43	1.4	-0.4	1.4	-0.3	-0.3	1.5	-0.3	-0.2	-2	-3	0.7	0.6	41	-4	0.2	115.6	117.1
96	0.44	1.3	-0.4	1.3	-0.3	-0.3	1.3	-0.3	-0.3	-3	-4	0.7	0.7	41	-5	0.2	114.2	115.9
97	0.45	1.1	-0.5	1.1	-0.4	-0.4	1.1	-0.4	-0.4	-3	-4	0.8	0.8	42	-6	0.1	112.4	114.4
98	0.48	0.9	-0.6	0.8	-0.4	-0.5	0.7	-0.4	-0.5	-4	-5	0.9	0.9	42	-6	0.0	110.3	112.4
99	0.51	0.6	-0.7	0.4	-0.5	-0.7	0.1	-0.5	-0.6	-6	-7	1.1	1.2	45	-8	-0.2	106.6	109.0
100	0.70	-1.1	-1.4	-2.4	-1.0	-1.8	-2.7	-1.1	-1.8	-17	-18	2.6	2.9	49	-13	-0.8	82.1	82.7

SHEEP GENETICS



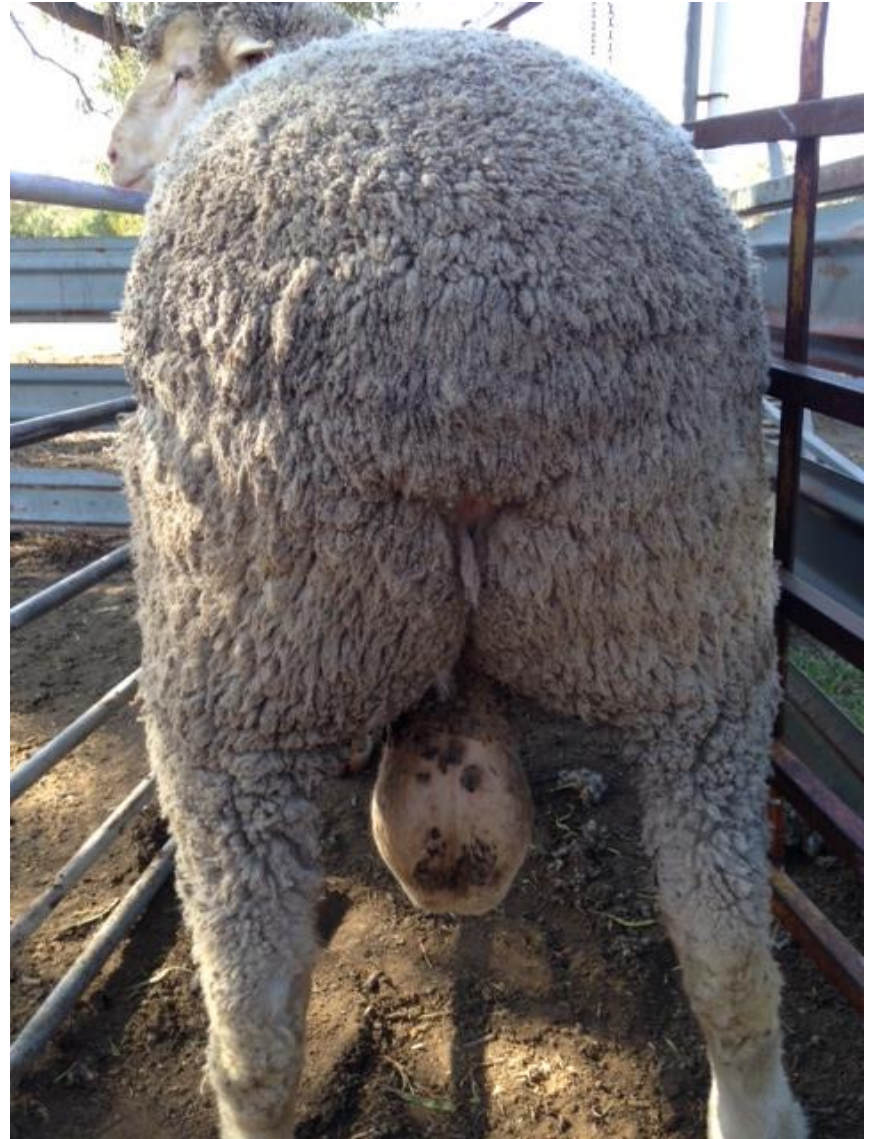
OTHER SHOW ISSUES – ADULT WEIGHT OBSERVATIONS

Percentile Chart

- Indicates actual movement in Kilograms etc.
- Gives historical perspective i.e start year of 2000 all trait values started with 0 at 50 percentile.
- Since then all weight traits except for MWWT and including PSC have moved 49 percentile points.
- Let us assume that present day WWT actual stands at 38kgs.
- If we assume that present day actual AWT is double the WWT then it will stand at 75kgs.
- Since year 2000 WWT has moved by 3.2kgs or approximately a rate of 10% compound every 20 years.
- There has been no AWT measurement so that assuming the same 10% compound every 20 years AWT started at 68kgs in year 2000, by year 2020 it will be 75kgs and year 2040 82.5kgs.

OTHER SHOW ISSUES - MUSCLE

- Loin depth measurement is not highly heritable and improvement is very slow.
- Anecdotally phenotype is more highly heritable.
- Three other areas of equal importance are loin length or area and butt depth and width.
- Consider changing to intermuscular fat scanning.



CONCLUSIONS

- This presentation concentrates on wean weight and number.
- Show direction has a high potential influence on breed direction.
- OVIS heritability remains inadequately tested.
- OVIS group traits show little correlation to actuals.
- OVIS individual trait variation with actuals can appear extreme.
- OVIS pursuance of increased growth and adult weight is extremely antagonistic to reproduction (NLW) and production (efficiency).



RECOMMENDATIONS

Dohne Council

- Council discuss breed measurement future pathways for adult weight, wool, muscle and NLW.
 - ASBV AWT, measure actuals at 2 years or weaning and incorporate with OVIS.
 - ASBV YCFW, use WPP at 250 day measure cycle and incorporate with OVIS.
 - ASBV EMD, investigate EMA ability to incorporate loin or body length.
 - ASBV NLW, discard actual NLB and replace with actual NLW.



Show Committee

- Only measurement perusal method to be used by judges.
- All pen cards to be displayed in percentiles only.
- ASBV NLW should not be used and ASBV YCFW should be reviewed with WPP figures.
- Judge objectively for curve bending figure not weight figure i.e WWT divided by AWT.
- Judges be advised that standard accuracy variation be + or - 30 percentile points.



OVIS AVERAGES THE ORIGINAL STANDS ALONE



By Murray Rogerson