Boer Select Breeders Group
Buck Evaluation Program

Report on Measured and Visual Traits

Condobolin Agricultural Research Station
New South Wales
23 October 2014

With support from

Meat & Livestock Australia acknowledges the matching funds provided by the Australian Government to support the research and development detailed in this publication.

Acknowledgments

The Boer Select Breeders Group Buck Evaluation Program would not have been possible without the industry funding made available by Meat & Livestock Australia (MLA) through its Producer Demonstration Site (PDS) program.

Other commercial partners including Allflex, Stockwatch, Riverina Co-op and Te Pari have also greatly assisted in making the program possible.

Boer Select members who contributed their genetics to the trial have clearly been an integral part of the program and it is hoped they have received back as much knowledge and experience to compensate for the time and effort of being involved.

Sheep Genetics for the analysis and production of KIDPLAN results.

Paul Hamilton of Semtech for the expert advice and professionalism leading up to and during the AI program.

Allan Casey and NSW DPI for the visual assessment of all progeny and the hosting of the field day at Condobolin Agricultural Research Station.

The largest acknowledgement though must go to Colin and Rob Ramsay who provided their property as a trial location and gave a generation of their breeding over to the trial. Their ongoing commitment to the trial from the beginning to the end has been unmatched. Their attention to detail in every process to ensure the integrity of the data and the welfare of the animals at all times has been first class. The industry owes a great deal of gratitude to the Ramsay's for the commitment and effort they have contributed.

Foreword

The Boer Select Breeders Group (Boer Select) is a group of dedicated Boer goat seedstock producers that are committed to the adoption of performance breeding in the goat industry. They were formed in 2011. Boer Select is not a formal organisation or association, but a group of like-minded producers who aim to improve the genetics of the Boer breed and subsequently the rangeland goat herd by supplying commercially focused, performance recorded, fit for purpose animals to commercial herds.

In April 2013, with the assistance of funding from Meat and Livestock Australia (PDS), the Boer Select Buck Evaluation Program was commenced with the joining of 9 Boer bucks via AI to a group of 349 does at Dudauman Park, Bethungra NSW. The AI program was carried out by Paul Hamilton, Semtech. Dudauman Park is owned by Colin and Rob Ramsay. The does joined in the program were Dudauman Park bred. A further 2 backup bucks were joined, resulting in a total of 11 bucks entered in the trial.

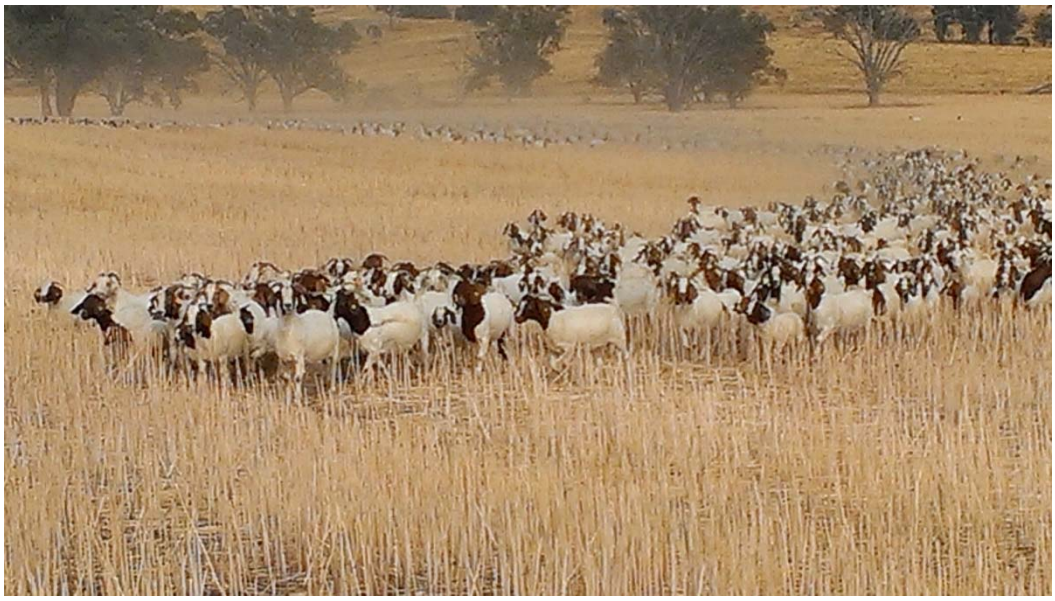
In September 2013 a total of 590 kids were born as part of the Boer Select Buck Evaluation Program. Over the following 12 months the progeny were been thoroughly assessed for both measured and visual traits. All measured data was analysed by Sheep Genetics' KIDPLAN program to produce Estimated Breeding Values (EBVs).

The Boer Select Buck Evaluation Program is designed to showcase the genetics available to commercial goat meat producers that have the potential to increase productivity and therefore profitability in the commercial farming and rangeland environments.

Through the improvement of linkage in the KIDPLAN system, the Boer Select Buck Evaluation Program will also allow breeders to more easily benchmark their own genetics and therefore realise higher rates of genetic gain.

Participants in the program have also gained first-hand experience with the processes of trait measurement, data management, submission to KIDPLAN and understanding of the results that are generated. This will assist them increase their own rates of genetic gain and in turn the productivity of the commercial industry.

Many breeders are currently only focused on growth. Carcase attributes, worm resistance and reproduction are other important production traits that are currently not commonly recorded due to a lack of understanding in the process of measuring these traits and the cost / benefit relationship of doing so. Including these traits in the program has allowed breeders and the commercial industry to be more informed on the benefits of assessing these traits.



Contents

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Manager's Report

INTRODUCTION

Goats have been run at Dudauman Park since 1999 when 3000 feral does and 70 full-blood bucks were bought in to begin a crossing-up program to produce goat meat for domestic and export markets. There were serious production problems and, by about 2007, it was evident that many of these were related to genetics, particularly survival, conformation, growth rate and worm resistance. Initial evaluations in KIDPLAN confirmed that the genetics of the replacement bucks we were using were highly disparate and inadequate for production purposes. Meantime, KIDPLAN entries (following an excellent start from the late 1980s to the mid-1990s) had virtually ceased, with only the Tambookie Stud in WA persisting. Our need to use KIDPLAN in our selection process coincided with MLA's wish to reinforce goat data in the KIDPLAN database and find viable genetics for extensive grazing operations. The Boer Select Breeders Group Buck Evaluation Trial was conceived in late 2012 with Blair Brice (MLA), Tom Hooke (Sheep Genetics) and Ben Swain (BCS Agribusiness) showing the way.

LOCATION

For the first half of the trial, the animals were run at Dudauman Park, a dorper/crop/goat property of 2500 acres, about 20kms West of Cootamundra, NSW. The country has rocky hills falling to arable slopes and the rainfall is supposedly about 600mm per year but extremely variable by year and by season. Good rain in Autumn and Spring are essential to good crops and pastures. Summer can be very hot and dry with periods around 40 degrees and intermittent storms. Winter is typically very cold with short green feed. Management of internal parasites and feed levels are essential to animal health but not always easy to do in the highly variable seasons.

The Dudauman Park property was sold in late 2013 and the stock were moved in early 2014 to leased country about 20 kms away at Englefield, near Bethungra, NSW. Weather conditions there are the same as at Dudauman Park but the country is flatter and more arable, with improved pastures, in contrast to the rocky, unimproved pastures of Dudauman Park.

SEASONAL CONDITIONS

2013 was a fairly dry year (375 mm) with most of the rain falling in late Autumn and Winter. The 380 Boer does of the breeding herd were mated in April/May 2013 and were maintained on unimproved green pastures of grasses and broadleaf weeds, usually wet. In early Spring, before kidding started, they were moved to fresh pasture of ryegrass, barley grass, capeweed, paterson's curse, lucerne and clover, in generally good condition but with some lameness. The trial kids were born in September and October, initially with ample pasture and milk available. By November, however, it was becoming dry, and a very hot, dry Summer ensued with feed and water at critical levels by late February 2014. By that time, the kids were in drought-lot with only hay, staying reasonably healthy but losing weight. A sudden, early Autumn break brought relief in the last days of February, pastures recovered through March and there was an excellent Autumn and Winter with the animals gaining weight and condition into Spring 2014.

DOES AND MATING

The Dudauman Park breeding herd (about 380 full-blood and purebred Boer does with a few lower crosses) was committed to the trial. In 2013, the herd was young with 26% maidens and 30% second-kidders. Nine mating groups of about 40 does were randomised to be as close to identical as possible. The remaining 15-20 does were retained for non-trial purposes but continued to run with the same mob. AI matings were conducted on 10th, 11th and 12th of April 2013 by Paul Hamilton of Semtech, Berwick, Vic, using frozen semen from 7 studs (Cadenza, Winfield, Macgregors, Terraweena, Davel, Tambookie and Kurrajong) plus fresh semen from a Dudauman buck which was also used as a backup buck to provide data linkage between AI and backup management groups. The Kurrajong semen was from a historical 1997 sire to improve data linkage to the historical KIDPLAN data. Dudauman bucks were introduced to three backup doe groups on 26th April.

PREGNANCY & KIDDING (IN GOOD CONDITIONS)

All does were pregnancy scanned for dries, singles, twins and multiples on 19th June with about 62% reporting pregnant to the AI mating. They were vaccinated with Glanvac 3-in-1 with Se and B12 a month before start of kidding and drenched with Zolvix two weeks before. AI and backup does were kidded in separate but adjacent paddocks of about 25 ha and 15 ha respectively with similar feed. Most AI kids were born from 4th-11th September. Backup kids were mostly born from 26th Sept to 7th October with the weather favourably warm throughout. Apart from tagging and taking weights within 24 hours of birth, there was no human interference in kidding or kid survival. There were some fox attacks and an ordinary number of kid deaths. There were no major weather events but worm burdens built up gradually until marking.

Approximately 700 kids were born (in the total kidding group) with about 15% not surviving the first couple of weeks. Survival by sire was notably variable – 27% of the kids by one sire did not survive the birth period, while only 8% of the kids by another sire failed to survive.

MARKING & WEANING (IN A HOT, HUNGRY SUMMER)

536 kids were marked on 14th November for a marking rate of 142%. At the same time, scores were recorded for colour, teats, testicles and mouths, and purebred males with serious faults were wethered. There were minor losses as worm burdens built up to over 780 epg but there were delays due to harvest and the mob (380 does with 530 kids at foot) was drenched with Zolvix on 6th December.

With the weather getting hotter and drier, and no good pasture available, about 519 kids were weaned on 9th January and weighed on 21st January, healthy but light (average WWT of 21.7 kg). In late January they were given their second vaccination and moved into drought-lot with hay. There were further minor losses and substantial loss of weight; by late March, the average weight had fallen 14% to 18.7kg (EPWT).

GROWTH (IN A GOOD AUTUMN & WINTER)

By late March, pasture conditions were improving, the kids started recovering, and loss rates stabilised. In early June, 475 kids were weighed for an average of 25.9 kg (PWWT).

The worm burden was allowed to build up through winter to facilitate WEC calculations. When individual WEC samples were taken in late July, the worm counts ranged from less than 100 epg to over 5000 epg. The kids were then drenched with Pyrimide 3+ with Se and Co and put on good improved pasture.

FINAL ASSESSMENTS

All the trial progeny were classed on 24th September by Allan Casey (NSW DPI) and his team, recording scores for 8 visual traits (Jaw, Legs and Feet, Shoulder and Back, Head and Horns, Colour, Non-fibre Pigmentation, Testicles, Udder and Teats) and a Classer's Grade.

On 25th September, Stefan Spiker measured eye-muscle, fat depth, scrotal circumference and weight (average YWT 39.2 kg). Bucks were substantially heavier than does, bucks about 46 kg, wethers about 38 kg, does about 34 kg.

Though not required under the protocol for the trial, stud classifications were conducted on 3rd October by Celia Burnett-Smith (Classimate Services).

COMMENTARY, CONCLUSIONS & LESSONS

Nutritional and weather conditions were a roller-coaster through the trial period. Kidding conditions were good, with ample feed, moderate worm burdens, and no major storms or high wind-chill episodes, any of which can be deadly. In contrast, the tightening Spring and the lack of good feed in the hot, dry Summer period was a major setback. After that, growing-out conditions were good and weights recovered on good pasture.

Management. The animals were run as similarly as possible to dorpers in an extensive farmed system. Apart from the necessary interventions for tagging, weighing and other testing, the only assistance or supplements they received was hay when they were forced into drought lot in February 2014. It is clear in hindsight that the kids were under-fed at that stage. Though they recovered well on later pastures, they would probably have done much better if they had not lost weight after weaning. It seems particularly important to understand post-weaning nutrition better.

Genetic variability in the group seems to be high, as exemplified by the huge spread in WEC counts and sire YWECs. However, no one sire has emerged as superior across the board. Rather, different sires appear, at this stage, to have different genetic merits and be suited for different purposes. Careful and appropriate sire selection with the purpose in mind will be important.

Kid survival emerged as a particularly interesting and important area. Goats habitually produce twins and triplets, following which perinatal losses of 10-50% are common, according to the literature. In this trial, the main losses were immediately after birth – kids born but not cleaned and raised or dying within days of birth. Aggregate losses to weaning were sire-dependent - typically 24-29% for most sires but one sire lost 36% of his kids and another only 15%. There are evidently big gains to be made by understanding this better.

Assessment and Management Program

Activity		Date/s	Age (average)
Selection of does		1 March 2013	
AI of does		10 – 12 April 2013	
Backup bucks joined		26 April 2013	
Pregnancy scanning		19 June 2013	
AI Kidding: start – finish		31 August - 13 September 2013	
Backup Kidding: start – finish		20 September – 7 October 2013	
Marked kids		14 November 2013	60 days
Weaning		9 January 2014	116 days
Body weighing	W	21 January 2014	4 months
	P	18 March 2014	6 months
	P	5 June 2014	9 months
	Y	25 September 2014	12 months
Worm egg count sampling	Y	22 July 2014	10 months
Visual Trait Assessment	Y	24 September 2014	12 months
Carcase Scanning	Y	25 September 2014	12 months
Vaccination		14 November 2013 (Glanvac 3in1) 25 January 2014 (Glanvac 6in1+Sel+B12)	
Drench		6 December 2013 (Zolvix) 27 July 2014 (Prymide) 15 October 2014 (Dectomax Injection)	
Supplementary feeding		Confined to drought lot during February 2014	
Field day		23 October 2014 (Condobolin)	

Rainfall

Rainfall as recorded at Cootamundra, NSW during the trial period.

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec	Total
2013	11	42	25	4	36	78	62	43	21	18	17	18	**375**
2014	19	76	95	82	34	100	34	23	31				**494**

Visual Trait Assessment and Herd Breeding Objective

Visual trait assessment

The visual traits recorded were assessed by Mr Allan Casey, NSW DPI.

Herd Breeding Objective used to assess the Classer's Grades

The Breeding Objective used by the classer/s when selecting the Classers Tops, Flock and Cull Grades is described below. The Breeding Objective for both measured and visual assessed traits that is described below was developed by the owner of the trial herd in consultation with the classer prior to the grading.

The Breeding Objective is to produce a goat that is Boer in appearance and commercially robust so that bucks can be used as sires in rangeland or extensive farming environments. Sound conformation, good carcase shape, high growth rates, high worm resistance and reproductive soundness are the focus of the breeding program.

Understanding the Measured Results and Indexes

Measured Traits, Indexes and Classer's Grade – Table 1

Buck Code:	The buck's code used throughout the report.
Number of progeny:	The number of progeny a buck had in the trial at the final assessment.
Estimated Breeding Values:	Estimated Breeding Values (EBVs) calculated by Sheep Genetics for the bucks evaluated in this report. EBVs describe the relative breeding value (genetic performance) of the bucks (in this case based on the performance of their progeny). A buck's progeny will express half of their bucks EBV. EBVs do not necessarily reflect the buck's observed performance, which is a combination of both genetic and environmental influences. EBVs are an estimate of the genetic component of the buck's performance. More information of EBVs can be found on page 15.
Traits: Abbreviation, trait and the (units reported)	WT: Body weight (kg) EMD: Eye muscle depth at the 'C' site (mm) FAT: Fat depth at the 'C' site (mm) WEC: Worm egg count (% deviation in worm burden of sire's progeny) SC: Scrotal circumference (mm) NKW: Number of Kids Weaned (%) MWWT: Maternal Weaning Weight (kg)
Age at assessment:	B = Birth - 0 to 24 hours W = Weaning - 42 to 120 days (6 weeks to 4 months of age) P = Post Weaning - 210 to 300 days (7 to 10 months of age) Y = Yearling - 300 to 400 days (10 to 13 months of age)
Indexes:	**SRC: Self Replacing Index** Based on a self-replacing herd with a strong emphasis on growth and carcase traits. This index places emphasis on BWT, WWT, MWWT, PWT, PEMD, PFAT, NKW and PWEC. **C+: Carcase Plus Index** Based on a meat production herd that seeks to produce goats with high growth and muscle, while maintaining carcase leanness. This index places emphasis on WWT, PWT, PEMD and PFAT.
Classer's Grade:	A classer grades all progeny as either, Tops, Flocks or Culls based on their visual assessment of all traits relative to the site's Breeding Objective (see page 7). The percentage deviation from the average of Tops and Culls is presented in this report.

Table 1: Measured Traits, Indexes and Classer's Grade

This table shows Estimated Breeding Values (EBVs) calculated by Sheep Genetics for the bucks evaluated in this report. The EBVs are based on all available information each buck has in KIDPLAN, not just the results of this trial.

The highest 2 performing bucks (or more if there is a dead heat) for each trait and index (trait leaders) are highlighted by shading.

The index values reported are based on measured trait EBV performance with varying emphasis on key traits. See page 8 for more information.

Buck Code	Breeders herd, Buck name	Number of progeny	Estimated Breeding Values (deviations)								Indexes		Classer's Grade[1]	
			WT kg				FAT mm	EMD mm	SC mm	WEC %	SRC $	C+ $	Tops %	Culls %
			B	W	P	Y	Y^	Y	Y	P			Y	Y
1	Terraweena, Abraham ABM-3255	32	-0.1	-0.2	-0.3	0.3	0.7	0.4	0.1	15	100	100	-13	-8
2	MacGregors, Karoo TI-7132	23	0.0	1.3	2.4	3.9	0.5	1.1	0.6	4	105	120	13	-4
3	Cadenza, Bart CA-0006	39	0.1	1.8	2.7	3.2	0.3	0.0	0.9	45	104	113	3	-7
4	Cadenza, Barney CA-0058	19	0.3	1.3	2.0	1.9	-0.3	0.3	0.7	5	104	114	-4	-1
5	Dudauman Park, Digger DPK-9167	60	-0.1	0.6	1.5	1.8	0.3	0.0	-0.9	2	97	105	0	5
6	Dudauman Park, Shosa DPK-0018	46	0.2	0.4	0.0	0.7	-0.4	-0.3	0.0	0	89	99	-3	5
7	Dudauman Park, Aryan DPK-0215	41	0.0	-1.2	-1.3	-0.1	0.2	-0.2	-0.3	-30	88	89	-4	7
8	Kurrajong, Peter KHB-1072	33	0.4	1.1	1.9	2.2	-0.2	-0.2	-0.3	2	102	108	-2	7
9	Davel, Nixon RAD-0361	42	-0.1	0.3	1.0	2.2	-0.4	0.0	0.9	35	102	105	5	4
10	Tambookie, Gordon TAM-8029	31	0.1	1.5	3.4	4.8	0.3	0.8	0.3	-3	107	122	16	-7
11	Winfield, Sam WIN-9089	48	0.0	0.2	-0.3	-0.5	0.9	0.8	-0.2	-19	95	104	-6	-7

^ B = Birth (0 to 24 hours) W = Weaning (42 to 120 days); P = Post Weaning (210 to 300 days); Y = Yearling (300 to 400 days)

1 Classer's Grade is expressed as the percentage deviation of average Tops% and Culls%.

Understanding the Visual Results

Scored trait performance – Tables 2a, 2b, 2c

The following description of trait scores is a summary of the detailed word description of these scores developed as part of the Boer Select – Buck Evaluation Program.

A deviation from the average trait score for all progeny is reported as well as the percentage of the buck's progeny recorded for each trait.

The highest 2 performing bucks (or more if there is a dead heat) for each trait and (trait leaders) are highlighted by shading.

■ Jaw and Teeth:	Soundness of the jaw structure, including the alignment of the lower jaw and its teeth relative to the top jaw and its pad that the lower teeth bite onto, the placement of the teeth, structure of the muzzle and lower jaw. **1** (very well aligned) to **5** (heavily undershot or overshot).
■ Legs and Feet:	Soundness of the front and back leg and feet structure, in particular the orientation of the legs, the angulation of the hocks and pasterns to the feet and the shape of hoof and toes. **1** (very straight) to **5** (very angulated).
■ Shoulders and Back:	Soundness of the shoulder blades, their positioning in relation to the neck and spine and the shape of the topline. **1** (very square) to **5** (very dipped or high).
■ Head and Horns:	Shape of the head and placement of horns. **1** (wide head, horns set well apart) to **5** (narrow head, horns that are set very close together?
■ Colour:	The closeness of the goats hair colour to the Boer breed standard. **1** (red-brown head and a white body) to **5** (Largely or entirely solid colours).
■ Non-fibre pigmentation:	The percentage of pigmentation on two areas, the bare skin under the tail and hooves. **1** (75 to 100% pigmented area on both of the bare skin areas) to **5** (0% pigmentation on any the bare skin areas).
■ Udder and Teats:	Shape and soundness of the udder plus the number, placement and shape of the teats.**1** (well shaped, even udder with up to 2 teats on either side) to **5** (uneven udder with more than 2 teats on either side).
■ Testicles:	Structure and soundness of the testicles and scrotum. **1** (large, no spilt in scrotum) to **5** (small, twisted or excessive split in scrotum).

Table 2a. Visual trait assessments – Conformation

Visually assessed traits reported were scored at the yearling assessment with the exception of Testicles which was scored at marking as well as the yearling assessment.

Traits are reported as a deviation (Dev) from the average trait score for all progeny. The percentage of a bucks's progeny assessed for each score is also reported.

For the majority of breeder's objectives a negative deviation would be considered favourable and the larger the deviation the better.

Breeders herd, Buck name	Conformation																							
	Jaw						Legs and Feet						Shoulder and Back						Head and Horns					
	Dev	1	2	3	4	5	Dev	1	2	3	4	5	Dev	1	2	3	4	5	Dev	1	2	3	4	5
Terraweena, Abraham ABM-3255	0.0	100	0	0	0	0	-0.3	55	30	9	6	0	-0.1	88	9	3	0	0	-0.1	36	64	0	0	0
MacGregors, Karoo TI-7132	0.0	100	0	0	0	0	0.0	48	26	17	4	4	0.0	87	4	9	0	0	-0.2	43	52	4	0	0
Cadenza, Bart CA-0006	0.0	100	0	0	0	0	-0.2	49	33	15	3	0	0.0	85	5	10	0	0	0.1	23	64	10	3	0
Cadenza, Barney CA-0058	0.0	100	0	0	0	0	-0.2	63	5	21	11	0	-0.2	95	5	0	0	0	0.1	26	58	16	0	0
Dudauman Park, Digger DPK-9167	0.0	98	0	0	0	2	-0.1	52	17	23	8	0	0.1	77	13	7	3	0	0.0	42	42	17	0	0
Dudauman Park, Shosa DPK-0018	0.0	100	0	0	0	0	0.3	24	37	26	11	2	0.0	85	9	4	2	0	0.0	35	57	9	0	0
Dudauman Park, Aryan DPK-0215	0.2	95	0	0	0	5	-0.1	46	24	24	5	0	0.0	88	0	12	0	0	0.2	27	51	17	5	0
Kurrajong, Peter KHB-1072	0.0	100	0	0	0	0	-0.1	61	9	18	12	0	-0.1	91	3	6	0	0	-0.2	45	48	6	0	0
Davel, Nixon RAD-0361	0.0	100	0	0	0	0	0.4	26	31	24	17	2	-0.1	95	0	5	0	0	0.1	31	50	17	2	0
Tambookie, Gordon TAM-8029	0.0	97	0	3	0	0	-0.1	45	26	29	0	0	0.0	84	6	10	0	0	-0.2	55	35	10	0	0
Winfield, Sam WIN-9089	0.0	100	0	0	0	0	0.1	44	21	21	10	4	0.1	79	10	8	2	0	0.0	35	52	10	2	0
Average performance	**1.0**	**99**	**0**	**0**	**0**	**1**	**2.0**	**45**	**24**	**21**	**8**	**1**	**1.2**	**86**	**7**	**7**	**1**	**0**	**1.8**	**36**	**52**	**11**	**1**	**0**

Table 2b. Visual trait assessments – Colour and Pigmentation

Traits are reported as a deviation (Dev) from the average trait score for all progeny. The percentage of a bucks's progeny assessed for each score is also reported.

For the majority of breeder's objectives a negative deviation would be considered favourable and the larger the deviation the better.

Breeders herd, Buck name	Colour and Pigmenation											
	Colour						Non-fibre pigmentation					
	Dev	1	2	3	4	5	Dev	1	2	3	4	5
Terraweena, Abraham ABM-3255	0.2	58	21	9	3	9	-0.1	88	9	0	3	0
MacGregors, Karoo TI-7132	-0.1	74	13	0	4	9	0.0	87	9	0	4	0
Cadenza, Bart CA-0006	-0.1	59	28	10	3	0	-0.1	95	0	3	3	0
Cadenza, Barney CA-0058	-0.4	89	0	5	5	0	0.1	89	0	5	0	5
Dudauman Park, Digger DPK-9167	-0.1	72	15	5	3	5	0.2	78	8	5	5	3
Dudauman Park, Shosa DPK-0018	0.1	65	17	4	7	7	0.2	85	2	4	4	4
Dudauman Park, Aryan DPK-0215	0.5	46	24	10	10	10	0.4	76	7	7	0	10
Kurrajong, Peter KHB-1072	0.3	61	12	12	0	15	-0.2	94	6	0	0	0
Davel, Nixon RAD-0361	-0.2	62	26	12	0	0	-0.2	100	0	0	0	0
Tambookie, Gordon TAM-8029	0.0	58	29	3	3	6	-0.2	97	0	3	0	0
Winfield, Sam WIN-9089	-0.3	75	19	0	4	2	-0.1	92	6	2	0	0
Average performance	**1.7**	**65**	**20**	**7**	**4**	**6**	**1.2**	**88**	**5**	**3**	**2**	**2**

Table 2c. Visual trait assessments – Reproduction

Traits are reported as a deviation (Dev) from the average trait score for all progeny. The percentage of a bucks's progeny assessed for each score is also reported.

For the majority of breeder's objectives a negative deviation would be considered favourable and the larger the deviation the better.

Breeders herd, Buck name	Reproduction											
	Testicles						Udder and Teats					
	Dev	1	2	3	4	5	Dev	1	2	3	4	5
Terraweena, Abraham ABM-3255	-0.2	100	0	0	0	0	-0.1	80	10	10	0	0
MacGregors, Karoo TI-7132	0.3	88	0	0	0	13	0.0	86	0	7	0	7
Cadenza, Bart CA-0006	0.2	91	0	0	0	9	-0.4	100	0	0	0	0
Cadenza, Barney CA-0058	-0.2	100	0	0	0	0	0.4	71	0	14	0	14
Dudauman Park, Digger DPK-9167	-0.2	100	0	0	0	0	0.0	86	4	4	0	7
Dudauman Park, Shosa DPK-0018	0.0	95	0	0	0	5	-0.1	93	0	0	0	7
Dudauman Park, Aryan DPK-0215	0.0	92	0	8	0	0	0.2	76	0	18	0	6
Kurrajong, Peter KHB-1072	0.5	83	0	0	0	17	0.3	75	5	0	10	10
Davel, Nixon RAD-0361	-0.2	100	0	0	0	0	-0.1	91	0	0	0	9
Tambookie, Gordon TAM-8029	-0.3	100	0	0	0	0	0.0	88	0	6	0	6
Winfield, Sam WIN-9089	0.1	94	0	0	0	6	0.0	83	4	0	9	4
Average performance	**1.2**	**95**	**0**	**1**	**0**	**4**	**1.4**	**85**	**2**	**4**	**2**	**6**

Table 3. Buck Averages for Measured Traits

Buck averages are the average performance of all the progeny of a buck. No account is made for factors that can improve the breeding value accuracy.

The highest 2 performing bucks (or more if there is a dead heat) for each trait and (trait leaders) are highlighted by shading.

Buck Code	Breeders herd, Buck name	Number of progeny	Litter Size	Sire Averages (deviations from the average)						
				WT kg				FAT mm	EMD mm	SC mm
				B^	W	P	Y	Y	Y	Y
1	Terraweena, Abraham ABM-3255	32	2.4	-0.2	-0.9	-0.3	-0.1	0.1	-0.1	-0.2
2	MacGregors, Karoo TI-7132	23	2.4	-0.1	1.3	1.1	1.3	0.2	1.4	0.5
3	Cadenza, Bart CA-0006	39	2.2	-0.2	1.1	1.1	2.5	0.2	0.2	-0.1
4	Cadenza, Barney CA-0058	19	1.5	0.7	2.7	2.6	3.8	0.1	1.4	1.2
5	Dudauman Park, Digger DPK-9167	60	2.0	0.0	-0.5	0.1	-1.2	-0.1	-0.7	-0.6
6	Dudauman Park, Shosa DPK-0018	46	2.0	0.3	-0.9	-0.1	-0.9	-0.1	-0.7	0.0
7	Dudauman Park, Aryan DPK-0215	41	2.0	0.2	-1.8	-1.9	-2.4	0.0	-1.2	0.0
8	Kurrajong, Peter KHB-1072	33	2.3	0.0	0.0	-0.8	-0.8	0.0	-0.7	-0.6
9	Davel, Nixon RAD-0361	42	2.2	-0.3	-0.7	0.4	0.4	0.0	0.1	0.0
10	Tambookie, Gordon TAM-8029	31	2.1	-0.1	-0.5	-0.7	-0.1	0.0	0.6	-0.4
11	Winfield, Sam WIN-9089	48	2.1	-0.1	0.2	-1.1	-2.5	-0.1	-0.1	-0.2
	Average Performance	**38**	**2.1**	**3.6**	**21.4**	**25.7**	**39.6**	**1.9**	**23.1**	**27.1**

^ B = Birth (0 to 24 hours) W = Weaning (42 to 120 days); P = Post Weaning (210 to 300 days); Y = Yearling (300 to 400 days)

Estimated Breeding Values

Estimated Breeding Values (EBVs) are reported by Sheep Genetics (SG). EBVs express the expected performance of progeny of a buck relative to another buck in the evaluation when mated to the same standard of ewes. EBVs improve the accuracy of buck results because they account for the association between traits, adjustment for birth effects and the number of progeny a buck has in the analysis.

True Breeding Values would be achieved if the number of progeny evaluated for each buck were infinite. Because the number of progeny in the evaluation is not infinite, performance shown in this report is described as *Estimated* Breeding Values.

Without progeny test information the correlation between the *Estimated* and *True* Breeding Value of bucks from different sources would be zero (0.0%). The correlation between *Estimated* and *True* Breeding Value improves rapidly from 0.0% with no progeny to 77% with 10 progeny. The rate of improvement in correlation slows from 86% with 20 progeny, to 90% with 30 progeny and 92% with 40 progeny. With an infinite population the correlation is 100%. Note that the correlation used in the above example is for a trait with a high heritability (0.5).

A heritability of 0.5 indicates that half or 50% of the measured performance is passed onto offspring. A heritability of 0.35 indicates 35% is passed on. The EBVs that are shown in this report have already accounted for heritability and therefore describe the performance that can be expected from a buck' progeny.