FACTORS AFFECTING THE SALE PRICE OF VELDRAM PERFORMANCE TESTED DORPER RAMS IN NAMIBIA

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ABSTRACT

Veldram performance testing has been conducted over a period of 14 years (1988 to 2002) at Kalahari Research Station in Namibia. During this period 2660 Dorper rams participated in 22 tests. Tests were conducted according to the rules for Veldram tests as endorsed by the Dorper Breeders' Society of the RSA. Rams that met growth and breed standards were put up for auction at the completion of each test. Ram entries steadily increased from 97 (1988) to over 200 in later years. Since 2003 National Veldram tests for Dorpers in Namibia have been discontinued. The popularity of these auctions for performance tested rams (89.4% of rams sold) indicate that Veld tested rams were sought after by buyers.

The sale price of 296 Dorper rams sold between 1994 to 2001, covering eight different tests, were compared with their measured and observed performances. Multiple regression and analysis of variance was carried out to determine which factors available to buyers significantly influenced price as well as their contribution toward ram prices fetched. The contribution of factors most consistently influencing price, namely Breed Classification (BC), Selection Index (SI), Average Daily Gain (ADG) and End test Mass (EM) indicate that buyers do recognize the importance of performance data in selecting breeding rams. They put most emphasis on Breed standards (visual appearance).

Although Breed Classification is still the industry standard used by buyers, top ranking rams (stud) did not perform consistently/significantly better than flock rams.

Keywords: Veldrams, sale price, buyers' preference, measured performance, breed classification, Namibia, arid.

1. INTRODUCTION

One of the most important economic decisions facing sheep breeders is the acquisition or provision of genetically superior sires (Campbell, 1962:60). The stud breeder needs to prove that (s)he provides genetically superior breeding animals to buyers. Globalisation in the livestock market, export of breeding material and AI, accentuate the importance of reliable breeding values for sires in any stock-breeding program.

The determination of the relative economic importance of traits emphasized in breeding and selection is a fundamental problem of animal breeders. This problem can be tackled by obtaining the relationship of sale price to merit of animals sold, since the buyers' willingness to pay more for animals of greater apparent merit in specific traits is one measure of the worth of these traits (Terrill, 1953:419).

If buyers of centrally tested rams consider performance evaluation measurements to be meaningful in decision making, higher performing rams should sell for higher prices than lower performing rams.

In the past the identification of sires to be introduced into a flock was probably based on the source stud of the ram rather than the individual ram (Roberts, Atkins, Cottle, Eppleston, James, Lollback, Schumann & Reed, 1991:3). The practice of sire-selection based on breed standards alone, i.e. phenotypic criteria, can be questioned since it has been proven to be limited in achieving the objective of selection for genetically superior animals (Roux, 1961; Van der Merwe and Poggenpoel, 1977; Olivier, 1980; Roberts, *et al*, 1991; Neser, Konstantinov &

Erasmus, 1995; Bosman, 1997). As an alternative to phenotypic selection, the concept of selection on measured performance was introduced. Centralised performance testing and progeny testing has become standard practice in the identification of superior individual animals for the genetic advancement of flocks and breeds and is currently practiced on a global scale. Yet, Olivier & Cloete (2006:1) report that breed improvement of the Dorper is still based mainly on subjective assessment in the show ring.

Red meat production is an important commodity in Namibia. Lamb and mutton produced from the Dorper (64% of sheep numbers) makes out the largest percentage of mutton sold in Namibia (Dir. Vet. Serv. Census, 2005). Lamb is also exported to South Africa (5 000 t) and Scandinavia (500 t), which contributes significantly to Namibia's annual income from exports (Müsellier, 2005). Total Namibian Dorper numbers amount to about 1.7 million, located mainly in the central and southern part of the country, estimating the requirement of approximately 8 000 rams per annum to maintain its current production (Von Schauroth, 2007:1). To keep its market advantage, continuous effort towards scientific/genetic advancement of the Breed is crucial.

Production from arid extensive areas covering most of the RSA and Namibia (Nel, 1980:305; Fourie, 1999:1) may be increased by selection of adapted breeding animals carrying the genetic make-up for efficient use of natural pastures with the least cost (Nel, 1980:306; Neser, 1999:28; Cloete, Snyman & Herselman, 2000:119; Ramsay, Swart, Olivier & Hallowell, 2000: 339: Von Schauroth, 2007:1). Scientific measurement of the performance of breeding rams at centralised tests is important. The predicted adverse effect of global warming on the drier parts of Southern Africa stresses the importance of identifying adapted genetic material through centralised testing in extensive conditions. Du Pisani, (2001:31) analysing rainfall statistics across Namibia shows that with the majority of rainfall stations the mean annual rainfall trend over the last fifty years is definitely negative.

The formal central testing of young rams in extensive conditions was introduced in 1983 in the RSA (Campbell, 1989:53) and became popular from 1984 in Merino's (Poggenpoel, 1989:50) and with Dorpers in 1985 (Nel, 1993:203). The acceptance and progress of Veldram testing was reported on in the popular press (Dreyer, 1988:23-33; Pretorius, 1994:20-23 & Olivier, 1997: 34-35).

Namibian National Veldram performance testing has been conducted over a period of 14 years (1988 to 2002) at the Kalahari Research Station in Namibia. Tests were conducted as a joint venture between the Ministry of Agriculture and different small stock Breeders' Societies of Namibia. Over this period 2 660 Dorper rams participated in 22 tests. These tests have been terminated in 2003. The perception of buyers on the importance of measured and observed factors, analysed for their contribution effect on sale price of rams is a good indication for scientists and breed societies on the direction they need to take for rapid advancement of their respective breeds.

1.1 Economic Importance of Ram Traits to Buyers

As early as 1953, Terrill (1953:419-430) reported on the correlation between sale price and merit in auctioned rams at the U.S. Sheep Experiment Station, Idaho. Significant correlations were found between price and body weight; price and mutton conformation and selection index, indicating that buyers placed the same emphasis on production traits as is placed on them due to relative heritability and economic importance at the time (Terrill, 1953:427). Available records analysed for **registered** and **unregistered** rams indicated, as expected, that buyers paid higher prices for registered compared to unregistered rams, in spite of the fact that unregistered rams had higher merit as shown by their average indexes (Terrill, 1953:428).

1.1.1 Results From Growth Tests at Central Stations on Full Fed Rations.

Lester, Notter & Mclure (1983:47) analysed auction prices received for performance tested rams at Virginia ram testing stations from 1964 to 1969, 1979 and 1980. Prices of 758 Suffolk, Hampshire and Dorset yearling rams were used for analyses. Factors used were **breed**, **year type score**, **birth type**, **final weight** (FW) and adjusted **16 month weight** (YW). These factors affected the log price significantly (p<0.01). The regression coefficients for Yearling weight and

final weight were the lowest for all tested factors. The coefficient for Yearling weight increased over the testing period suggesting that buyers valued performance measurements more over time.

Fitch, Butler, Golden & Denham (1986:212) analysed the sale price of 202 Suffolk rams, performance tested on a 70 day gain test. Records from 1981 to 1985 tests were analysed per year and pooled. Items included in the model and analyzing all possible combinations were the main effects of **type of birth**, **breeder**, commercial versus **registered** ram (CR), **birth date**, **birth year** and the covariates of average daily gain (**ADG**), **initial weight** on test, **final weight** off test, **weight per day of age**, **gain ratio** and **scrotal circumference**. Final weight influenced price in all years, ADG in two of the four years, breeder in the other two years and CR in one year significantly, suggesting ram weight as the important consideration for farmers.

For central ram tests in the Midwestern United states Waldron, Thomas, Wickersham, Morrical, Baertsche, Hudgens, Hirschinger & Kemp (1989:1199 – 1207) did a comprehensive analyses on 3942 and 3615 Suffolk rams respectively, tested from 1967 to 1985. Data from test stations in Iowa, Illinois, Indiana and Wisconsin was used. Central test performance and sale price of 1563 rams sold at public auction following the tests were analyzed to determine the relationship (regression coefficients) of sale price to **ADG**, **final off test weight** (FW) and **birth type** (BT); and to determine the proportion of variation in sale price accounted for by these three traits and **owner**. Subjective measurements were thus not included.

Central test ADG was a significant source of variation for price at all stations except Illinois. A unit of ADG was worth more in Iowa and Ohio, the two stations that had the most successful programs in terms of number of rams tested and years in operation. It was also much higher than the regression on sale price reported by Lester, *et al* (1983:47) in Virginia. If buyers will pay a premium for rams that are superior in ADG or other measured performance it will provide ram breeders with an economic incentive to provide rams with potential for high gains in central tests (Waldron, *et al*, 1989:1205). Buyers also paid more for heavier rams when ADG was equal as indicated by the significant regression of price on Final weight as well as for multiple born than single born ram lambs. This was also found by Lester, *et al*, (1983:47), for Virginia, although the regressions reported were much lower. This selection for heavier rams corresponds with the findings of Fitch, *et al*, 1986:212). Birth type did not significantly influence price in the study conducted by Fitch, *et al*, (1986:212), in Colorado.

By omitting different factors from the full model, Waldron, *et al*, (1989:1206), determined the impact of objective measurements (ADG, FW & BT) and ram owner/breeder in determining price by comparing the R^2 values. Data from the Ohio analyses indicated that ram performance was more important in determining price than ram owner while the opposite was the case in Illinois, Wisconsin and Indiana while in Iowa they were equally important.

1.1.2 Sale Price Analyses From Veldram Tests

Poggenpoel, (1989:50-52), analyzed and reported on the affect of seven performance measured factors on auction sale price of three Merino Veldram Clubs during 1987. The factors included **final weight** (FW) and six **Fleece measurements or indexes**. The models were analyzed by linear regression and C (p) measurement for significance. There was a good correlation of findings between the three different areas. Selection index (determined from final weight, clean fleece weight, fibre diameter and fold score) resulted in the factor influencing price the most. It accounted for 23% of the variation in sale price. All seven performance measurements accounted for 35% of the variation in sale price. Thus farmers also used other criteria, to a large extent, for decision making not explained by performance measurement. Poggenpoel, (1989:50), does not report on possible other influencing factors available to the buyer but mention possible factors like top line, horns, stance and several wool characteristics.

Fourie, Neser & Van der Westhuizen (2000:128-132) reported on the relationship between performance measurements and the sale price of rams in the Northern Cape Veld-Ram Club. The log of sale prices of 1609 Dorper rams sold between 1990 and 1999 were compared with their measured performances by analysis of variance and stepwise regression models. Factors included in the model were **Selection index** (SI), **final weight index** (FWI), **Growth per day of age** index (GDAI), **Auction weight** (AW), **Kleiber ratio** (KR), **Scrotal circumference** (SC), **Classification** (according to breed standards) (BS) and **Coat type** (CT). Breeder remained anonymous until the rams have been sold. BS had the highest partial contribution to the R^2 of the model (44.01 to 83.78 %) in eight years. Auction weight had the highest contribution in two

years. In the rest of the tests its contribution varied between 12.86% and 37.04%. The contribution of SI, when available was less than BS and AW. Fourie (2000:131), however, concluded that performance, as reflected in the selection Index, appears to play a significant role in determining sale prices.

 It thus appears that although measured growth performance factors are considered in decision making for the purchases of Dorper rams at Veldram auctions, classification according to Breed Standards has highest effect over all. This confirms to some extent the findings of Terrill (1953:428) and Fitch, et al (1986: 212) who included breed registration class in their models.

All models investigated agree that the weight of ram recorded nearest to auction time, had a significant influence on sale price. Scrotal circumference was included in the models of two authors but had a low to negligible influence on sale price. It may be argued that rams centrally tested and classified have to meet scientific standards for scrotal circumference which therefore may influence buyers to pay less importance to this factor.

Breeder or owner as an influencing factor on sale price as included in the models of Fitch, et al (1986:212) and Waldron, et al (1989:1199-1207) had a significant effect, which led some centrally testing bodies to exclude the identity of the owner, emphasizing the performance and appearance of the ram (Fourie, 1999:21; Fourie, 2000:128). This practice was not followed at the Namibian auctions and also not so at other Dorper Veldram auctions in the RSA like the Free State-, Upper Karoo- and Koegas Dorper Clubs (Fourie, 1999:27,30,34) and the Western Cape Veldram auctions (Hobson & Co, 2008). Disclosure of the identity of the breeder is also included in the Veld ram sale catalogues with other breeds, like the Merino (Fourie, 1999:21).

All authors sited have found that performance data played a significant role in choice of ram, with auction weight of rams playing a very important role. When visual appraised category according to breed standards was included, it had a considerable influence on sale price. Breeder also had a significant affect when disclosed.

The purpose of this paper is to determine what factors ram buyers in Namibia placed most emphasis on in choice of ram as indicated by its contribution to sale price and how it corresponds with analyses by other authors as a base for future planned advisory action.

2. MATERIALS AND METHODS

2.1 Test Area and Procedures

The Dorper Club of Namibia in co-operation with the Ministry of Agriculture and Rural Development implemented Veld ram centralized performance test for Dorper rams in 1988 at Kalahari Research Station (Farm: Rohrbeck) near Stampriet in the Hardap region. Average yearly rainfall is 224 mm.

The test area is situated in the Mixed Tree and Shrub Savanna of Namibia (Geiss, 1971:25). Veldram performance testing has been conducted over a period of 14 years (1988 to 2002). Data available for 22 tests from 1988 to 2002 record 2 660 Dorper rams entered. Of these 1193 (44.8%) rams met all growth, health, fertility and breed standards and were put up for auction; with 1067 (89.4%) sold. Of the auctioned animals 116 were classified as stud and 1077 as flock rams. After the conclusion of each test lasting between 150 to 180 days, the rams were sold at public auction. Each ram was provided with a certificate that included the measured results of the test.

Rams were evaluated and measured according to the rules for Dorper Veldram Sales of the Dorper Sheep Breeder's Society of South Africa (Grobler, 2005:4; Dorper Sheep Breeders' Society of SA, 2007:1-6).

Rams with an ADG index higher than 80 (85 for stud rams), a positive semen quality and classed by the breed inspector into respective Breed Selection Categories (e.g. stud, flock), were then feedlotted and conditioned for six weeks prior to auction.

2.2 Information Available to the Buyer - Auction Procedure and Catalogue

Rams were available for inspection before the auction. The ram's card with its performance measurements (Table 1, excluding Sale price) were available (Binnenman, 2009, personal communication). The auction catalogue contained the ram number, its ADG index, Breeder and from 1997 also Selection index. Breed classification was indicated by marker on each ram at the auction. The ram auction order was determined by the ADG index of the rams, per breeder. The rams were then auctioned from best merit to poorest.

2.3 Statistical Analyses

Auction data for eight intakes (Table 1) are available and was used to determine the influence of ram growth performance, Breed Classification and body measurements on sale price. Body measurements for five of the mentioned eight tests are available.

Table 1: Data available for different intakes.

Available data	Test Intake							
	1994_2	1997_1	1998_1	2000_1	2000_2	2001_1	2001_2	2002_2
BC[1]	√	√	√	√	√	√	√	0
ADG-I[2]	√	√	√	√	√	√	√	√
SI[3]	0	√	√	√	√	√	√	√
Starting mass°	√	√	√	√	√	√	0	0
End mass*	√	√	√	√	√	√	0	0
Starting SH[4]	√	√	√	√	√	0	0	0
End SH[4]	√	√	√	√	√	0	0	0
Starting BL[5]	√	√	√	√	√	0	0	0
End BL[5]	√	√	√	√	√	0	0	0
Starting BW[6]	√	√	√	√	√	0	0	0
End BW[6]	√	√	√	√	√	0	0	0
Starting SC[7]	√	√	√	√	√	0	0	0
End SC[7]	√	√	√	√	√	0	0	0
Breeder[8]	√	√	√	√	√	√	√	√
Sale Price	√	√	√	√	√	√	√	√

[1]-Breed Classification [2]-Average Daily Gain Index [3]-Selection Index [4]-Shoulder Height [5]-Body Length [6]- Body Width
[7]-Scrotal Circumference [8]-Breeder *- off test
√ -Available data 0 - Data not available

The Selection index includes final test mass and ADG where each contributes equally based on economical weight (Olivier, 2005). Selection index has been propagated as a good indicator for overall mutton ram performance in Veldram tests (Fourie, Neser, Olivier, & Van der Westhuizen, 2002:256).

All available factors, possibly affecting price, were included in the models. 'On test' starting measurements were excluded as earlier authors have shown that the final measurements and appearance on the day of auction has the most influence on price (Lester et al, 1983:47; Fitch, Butler, Golden & Denham, 1986:212; Waldron et al, 1989:1199 – 1207; Poggenpoel, 1989:51). Because of the limited data for the 2002_2 intake, it was excluded from the analyses.

To establish the contribution of the independent continuous variables on price, models for C (p) selections, analyzing all possible combinations and stepwise regression analysis (Table 2) were executed for each year. Sale data for intake 1997_1 to 2000_2 (n = 4) were combined into one model to compare the results of year models with the combined effect. The combined model for stepwise regression selection is presented in Table 3. Breeder, as contributing factor was difficult to establish as breeders differed between sales and did not exhibit rams in every breed category. As a categorical variable, it was included in the analysis of variance (Table 4).

Analysis of variance (ANOVA), with type III sum of squares, using the main contribution factors, free of possible interaction affects, were then executed to quantify each factor. In this analyses

'breeder', as categorical variable, were also incorporated. The effect of any interaction between factors were then determined.

As analyses reveal 'Breed Classification' as the main contributing factor towards price, ANOVAs on the influence of 'Breed Classification' categories (stud or flock) on price, on Selection Index, on ADG Index, and on indexes of 'end of test' body measurements were then performed.

3. RESULTS AND DISCUSSION

Multiple regression selection models for factors affecting the sale price were compiled. The factors included in the models are as follows:

Real Price = f, Breed Classification, ADG-Index, Selection Index (SI), End Test Mass (EM), End Shoulder Height (SH). End Body Width (BW), End Body Length (BL), End Scrotal Circumference (SC).

To ascertain the partial contribution of each factor on price, the model was tested by Stepwise regression analyses, per year (Table 2) and for the combined four years, 1997_ 2000_2 (Table 3).

Table 2: Stepwise regression models, reflecting factors substantially affecting sale price of Dorper rams for each specified intake.

Test intake	Analysis	Variables				Model R^2	n
1994_2	**Model**	**End mass***	**BC^1**			0.3064	32
	Par con[a]	0.1931	0.1132				
	C(p)	7.5690	4.5767				
	p[b]	0.0118	0.0378				
1997_1	**Model**	**BC^1**	**SI^2**	**$ADG\text{-}I^5$**	**End BW^3**	0.6804	57
	Par con[a]	0.3072	0.2955	0.0368	0.0408		
	C(p)	56.3462	16.0255	6.6508	2.3520		
	p[b]	<0.0001	<0.0001	0.0239	0.0129		
1998_2	**Model**	**BC^1**	**SI^2**	**End BW^3**	**End BL^4**	0.7609	53
	Par con[a]	0.4700	0.2420	0.0287	0.0202		
	C(p)	50.8956	7.2913	3.8805	2.0672		
	p[b]	<0.0001	<0.0001	0.0240	0.0495		
2000_1	**Model**	**BC^1**	**$ADG\text{-}I^5$**			0.7262	53
	Par con[a]	0.6768	0.0494				
	C(p)	7.2958	0.6985				
	p[b]	<0.0001	0.0042				
2000_2	**Model**	**SI^2**	**BC^1**			0.4720	41
	Par con[a]	0.3045	0.1675				
	C(p)	11.5774	1.8783				
	p[b]	0.0002	0.0013				
2001_1	**Model**	**BC^1**	**SI^2**			0.8486	30
	Par con[a]	0.8084	0.0401				
	C(p)	7.1148	2.1778				
	p[b]	<0.0001	0.0125				
2001_2	**Model**	**BC^1**	**SI^2**	**$ADG\text{-}I^5$**		0.7828	30
	Par con[a]	0.6967	0.0446	0.0415			
	C(p)	10.3093	6.9723	4.0000			
	p[b]	<0.0001	0.0401	0.0346			

[1]-Breed Classification   [2] - Selection Index   [3] - Body Width   [4]-Body Length   [5]- Average Daily Gain Index   [6]- Final test mass
[a]-partial contribution towards model R^2 [b] - probability

From Table 2 it is clear that Breed classification and ram growth performance either through ADG Index or Selection Index (growth combined with end mass) influenced sale prices

significantly in every year. Breed classification was a substantial influencing factor, being the most important factor in five of the seven years and exerting a significant influence on price in all of the seven years.

This is expected as stud rams realize better prices on auctions (Terrill, 1953:428 & Fitch, *et al*, 1986: 212). The influence of body measurements, measured closest to auction, indicate the influence of the presented animal to the buyer. This findings confirms the view expressed by Poggenpoel, (1989:51) that low correlations between sale price and measured performance may be due to the fact that measurements were taken six months before the auction of Veldram tested Merino's and is reflected in the partial contribution to the R^2 of auction weight (12.86 to 68.68) over 10 Dorper Veldram tests at Griekwastad, reported by Fourie (2000:131).

Von Schauroth (2007,iii,18), analysing growth and body measurements has shown that Body width and – length are highly correlated with End mass and make the largest contribution of measurements to End mass. Body measurements chosen by the model may thus be related to End mass.

Except for the 1994_2 intake (0.3064), the model R^2 ranged between 0.6804 (1997_1) to 0.8486 (2000_2) indicating that the factors included by the regression selection explain the price influencing factors substantially.

The combined model (Table 3) shows that Breed Classification with a partial contribution of 35.83% on Price, was the main factor influencing ram sale price with ram performance figures contributing less. This is in accordance with the findings of Fourie (2000:131) reporting Breed Classification making the largest contribution to auction price in most years. Selection Index was the main ram performance measurement influencing price, as expected. As a total ram growth efficiency measurement, including ADG and End Mass, it contributed less than half (16.6%) of the partial contribution to model R^2. ADG-I and End Mass made small contributions, although as variables they are incorporated in Selection Index.

Table 3: Combined Stepwise regression model for four intakes (1997_1 to 2000_2), reflecting factors significantly affecting sale price (Real price) of Dorper rams.

Test intake	Analysis	Variables				Model R^2	n
	Model	**BC[1]**	**SI[2]**	**End mass***	**ADG-I[3]**		
1997_1 to 2000_2	**Par con[a]**	0.3583	0.1660	0.0169	0.0195	0.5606	204
	C(p)	92.1706	18.5778	12.8823	6.0159		
	p[b]	<0.0001	<0.0001	0.0072	0.0033		

[1]-Breed Classification [2] - Selection Index [3] - Average Daily Gain Index *- Final Test Mass
[a]-partial contribution towards model R^2 [b] – probability

To quantify the effects of the selected variables or factors, identify interaction between them and verify the influence of ram breeder (ram origin) on sale price, the analysis of variance, type III sum of squares, are presented in Table 4. Variables included are Breed Classification, Breeder and Selection Index. Average Daily Gain and End Mass are not included as these measurements are embedded in Selection Index. Probabilities presented in bold indicates the significant variables selected by the model.

Table 4 indicates that the significant factors influencing price are Breed Category and Selection Index (1997_1, 2000_1and 2000_2). The interaction effect between Breeder and Breed Classification for 1989_2 can be explained (Table 8) and thus ignored. This then elevates the simultaneous significance of the named two factors to four years out of six. Breed Classification influenced price significantly in all 6 years, showing its powerful influence on price. Breed Classification is followed by Selection Index, significant in four years, considering the interaction effect (Breed Classification X Selection Index) in year 1989_2 as accidental, as will be discussed with Table 7.

The affect of Breeder (owner) on Price could not be significantly established. Waldron, et al, (1989:1206), reported that data from the Ohio analyses indicated that ram performance was more important in determining price than ram owner while the opposite was the case in Illinois, Wisconsin and Indiana. In Iowa they were equally important.

Table 4: Analyses of variance of Breed Classification, Breeder, Selection Index and interactions on Real Price for the intakes, 1997_1 t0 2001_2.

Intake Variable	1997_1 DF[1]	MS[2]	P	1998_2 DF[1]	MS[2]	P	2000_1 DF[1]	MS[2]	P	2000_2 DF[1]	MS[2]	P	2001_1 DF[1]	MS[2]	P	2001_2 DF[1]	MS[2]	P
BC[3]	1	9796.23	**.0062**	1	7260.69	.0004	1	23115.23	**.0001**	1	2224.54	**.0696**	1	15144.31	**.0001**	1	43758.15	**<.0001**
SI[4]	2	7687.32	**.0038**	2	6251.00	<.0001	3	1790.85	**.0031**	2	5131.32	**.0030**	3	759.97	.2745	2	93.51	.7201
BC[3]xSI[4]	0	.	.	1	2855.48	**.0125**	0	.	.	0	.	.	0	.	.	1	1018.81	.0777
BDR[5]	11	1822.81	.1415	14	395.57	.4264	17	504.88	.0956	12	718.77	.3452	8	168.38	.9459	6	1223.46	.0120
BDR[5]xBC[3]	3	2822.81	.0765	4	1160.81	**.0407**	1	38.53	.7087	0	.	.	0	.	.	1	1917.85	**.0209**
BDR[5]x SI[4]	12	1111.19	.4661	12	539.32	.2234	10	400.56	.2190	8	576.22	.4815	4	160.71	.8708	4	126.17	.7677
BDR[5]x BC[3]x SI[4]	0	.	.	2	1224.75	.0591	0	.	.	0	.	.	0	.	.	0	.	.
Error	25	1096.47		16	360.99		18	267.51		15	582.54		14	529.4			277.61	

[1] - Degrees of Freedom   [2] - Mean Squares   [3]- Breed Classification   [4]- Selection Index   [5]- Breeder

Table 5: Real Price means for Breed Classification in six intakes.

Intake Treatment	1997_1 N	Real Price (R)		1998_2 N	Real Price (R)		2000_1 N	Real Price (R)		2000_2 N	Real Price (R)		2001_1 N	Real Price (R)		2001_2 N	Real Price (R)	
Flock	51	91.21	b	44	90.51	b	49	89.41	b	38	86.83	b	26	80.74	b	26	83.73	b
Stud	6	181.03	a	9	156.27	a	9	206.96	a	4	125.78	a	5	200.18	a	4	205.78	a
LSD (P=0.05)		29.43			14.74			17.87			27.04			24.10			19.33	

Table 6: Real Price means for Selection Index category for the six intakes.

Intake SI category	1997_1 N	Real Price (R)		1998_2 N	Real Price (R)		2000_1 N	Real Price (R)		2000_2 N	Real Price (R)		2001_1 N	Real Price (R)		2001_2 N	Real Price (R)	
0 – 85	0	.		0	.		2	91.28	b	0	.		1	46.34	c	0	.	
86 - 100	20	72.62	c	24	82.40	b	8	82.25	b	9	59.16	c	8	67.19	bc	12	91.73	a
101 - 115	29	105.83	b	28	114.97	b	29	95.15	ab	21	88.84	b	16	121.06	a	17	104.50	a
> 115	8	152.06	a	1	191.89	a	14	114.93	a	12	117.04	a	6	96.54	ab	1	122.85	a
LSD (P=0.05)		25.49			34.14			20.77			20.67			40.61			31.41	

Table 7: Auction Real Price means (Rand) for Breed Classification, Selection Index interaction; Intake 1989_2.

Variable		Intake - 1998_2		
Breed Classification	SI category	N	Real Price (R)	LSD Ind.
flock	86 - 100	21	76.76	c
flock	101 - 115	23	103.06	bc
stud	86 - 100	3	121.91	b
stud	101 - 115	5	169.76	a
stud	> 115	1	191.89	a
LSD (P = 0.05)			32.46	

Table 8: Auction Real Price means (Rand) for Breeder, Breed Classification interaction; Intakes 1998_2 and 2001_2.

INTAKE	1998_2					
VARIABLE	Breed Classification category					
Breeder	flock			stud		
	N	Real Price (R)	LSD Ind.	N	Real Price (R)	LSD Ind.
1	2	103.85	cdef	2	164.80	a
2	2	85.79	ef	2	130.94	abc
3	2	115.14	cde	1	153.51	ab
4	2	72.24	f	2	162.54	ab
5	3	85.79	f	2	168.19	a
6	3	72.24	f			
7	4	88.04	ef			
8	3	78.26	ef			
9	3	**126.42**	bcd			
10	5	92.11	def			
11	4	84.66	ef			
12	3	81.27	ef			
13	2	94.82	cdef			
14	3	94.82	cdef			
15	3	90.30	def			
INTAKE	2001_2					
VARIABLE	Breed Classification category					
Breeder	flock			stud		
	N	Real Price (R)	LSD Ind.	N	Real Price (R)	LSD Ind.
1	6	67.57	fg	1	245.70	a
2	4	82.93	d	2	208.85	b
3	4	116.71	def	1	159.71	c
4	2	122.85	d			
5	1	98.28	def			
6	6	81.90	efg			
7	3	45.87	g			

The means of the variables in the models for each intake are presented in Tables 5 and 6. Realised price means for Breed Classification category (Table 5) show clearly that for each intake stud rams significantly fetched higher prices than flock rams, as is to be expected. This indicates that Breed Class (e.g. stud) is the industry standard indicating breeding excellence and perceived as such by the buyers of breeding rams.

Table 6 presents the Real Price means for the six intakes according to Selection Index category incorporated in the model. The differences in Real Price means between the Selection index categories per intake show a tendency for the higher indexed rams to fetch higher prices than the lower indexed rams. Rams indexed above 115 fetched significantly higher prices than lower ranked rams in four of the six intakes. These tendencies are not clearly differentiated in all years as there is no significant difference in average price received in year 2001_2, the order between the top two categories being reversed in year 2001_1. The same results for the bottom two categories in year 2000_1. Rams ranked above average (>100) received significantly higher prices than below average rams in only three of the six intakes. No trend over time is detected.

The significant interaction effect between Breed Class and Selection Index found for intake 1998_2 (Table 4) are detailed in Table 7 and the interaction effect between Breeder and Breed Classification revealed for intakes 1998_2 and 2001_2 are presented in Table 8.

For intake 1998_2, the interaction between factors Breed Category and Selection Index can be explained by stud rams within Selection Index category 86 to 100 fetching mean prices within the Least Significant Difference range of flock rams in the higher Selection Index category of 101 to 115. The Breeder, Breed Classification interaction may be explained by Breeder numbered 9, entering flock rams that fetched exceptional prices for the day. Thus, the actual factors influencing price in the 1998_2 intake points to Breed Classification and Selection Index as found for the other intake years.

As Breed classification is perceived to be the practical industry standard, used by breeders and commercial producers to identify rams for genetic and performance advancement of their flocks, it is important to know if rams classified as stud, and thus identified as the most excellent breeding material, did perform best under growth tests.

Von Schauroth (2007:iii) reporting on Namibian Dorper Veldram data indicated that breed inspectors, ignoring performance data, tended to select heavier rams for stud classification, concentrating most on visual body width and less on shoulder height, resulting in rams becoming significantly smaller over a 12 year test period.

In Table 9, ANOVA's on the influence of 'Breed Classification' categories (stud or flock) on price, on Selection Index, on ADG Index, and on indexes of 'end of test' body measurements are presented.

Table 9: Analysis of Variance of breeder selection on Price[1], SI[2], ADG-I[3] and End mass index per intake.

Test intake	Breed Classification	Variables and means				
	Category	PRICE[1]	SI[2]	ADG-I[3]	EM-I[4]	n
1997_1	Flock	1469.61	104.07	115.57	99.78	51
	Stud	2916.67	104.68	119.03	101.89	6
	P[a]	< 0.0001	0.8968	0.7991	0.6787	
	Category	PRICE[1]	SI[2]	ADG-I[3]	EM-I[4]	
1998_2	Flock	2004.55	100.57	101.33	99.35	94
	Stud	3461.11	104.37	105.96	103.16	9
	P[a]	< 0.0001	0.1436	0.3234	0.1767	
	Category	PRICE[1]	SI[2]	ADG-I[3]	EM-I[4]	n
2000_1	Flock	2106.12	108.14	128.94	99.38	49
	Stud	4075.00	115.12	125.80	107.60	4
	P[a]	< 0.0001	0.2716	0.8516	0.1680	
	Category	PRICE[1]	SI[2]	ADG-I[3]	EM-I[4]	n
2000_2	Flock	2071.05	109.87	132.00	100.29	38
	Stud	3000.00	105.68	123.20	97.24	4
	P[a]	< 0.0001	0.5297	0.6078	0.6327	
	Category	PRICE[1]	SI[2]	ADG-I[3]	EM-I[4]	n
2001_1	Flock	1742.31	104.70	111.08	100.26	26
	Stud	4320.00	106.66	133.48	98.70	5
	P[a]	< 0.0001	0.7077	0.0392	0.7648	
	Category	PRICE[1]	SI[2]	ADG-I[3]	EM-I[4]	n
2001_2	Flock	1703.84	102.62	120.58	n/a	26
	Stud	4187.50	101.08	98.75	n/a	4
	P[a]	< 0.0001	0.6608	0.1643		

[1]-Ram price in Namibian dollars   [2]-Selection Index   [3]-Average Daily Gain Index   [4]-End Body Mass-Index
[a] –probability   n/a – data not available

From Table 9 in can be seen that Breed Classification category had a high significant influence on price in all years as were indicated in the previous tables. Although the means for the performance measurements (SI, ADG-I and EM-I) were larger for stud rams over flock rams in five of the six intakes analyzed, its influence on performance measurements (SI, ADG-I and EM-I) are however, not significant. This is in agreement with the results recorded by Terrill (1953:428) and Fourie (2000:131) where buyers paid higher prices for registered against unregistered rams, in spite of the fact that unregistered rams had higher merit as shown by their average indexes.

This indicates that the emphasis placed on Breed Selection Category as indicator of performance excellence for the rams on the Veldram tests is not justified. It further shows that higher performance measurement standards set for rams to be classified as stud (ADG -index of 85 set for stud rams against 80 for flock rams), needs to be revised.

4. CONCLUSION AND SUMMARY

Buyers of rams at auctions consider several factors in the choice of breeding ram to buy. Thus many factors undoubtedly enter into the price that is paid for a ram at an auction sale other than the merit of the ram. The personalities and friendships of the buyers, as well as other psychological effects that cannot be measured, probably affect their choice for rams. The contribution of available factors (model R^2) built into sale price models indicate their importance in decision making.

The findings in this paper agrees with earlier findings that performance does play a significant yet subordinate role in determining sale prices of rams. Although other authors recorded trends for progress in the use of performance data for ram selection (Lester, Notter & Mclure (1983:47)), no trend in the increased contribution of performance data to sale price has been established for the tests done on Dorpers in Namibia or the RSA (as reported on by Fourie, 2000:131).

Thus the substantial contribution of Breed Category (according to Breed Standards) on sale price of rams in the different years reveals the importance buyers of rams place on this factor as an indicator of a good breeding ram. The subjectivity of this indicator has been somewhat strengthened with objective scientific standards by setting baseline performance measurements for Veld rams put on auction.

Although farmers did consider performance measurements in valuing rams its contribution influencing price is still sub standard. One contributing factor may be that farmers consider the scientific measurement and elimination of sub performing rams from Veldram tests sufficient performance measurement of the remainders as good breeding rams.

The fact that Stud rams did not perform better than flock rams in performance, indicates that stud breeders and the breed society need to re-examine norms and standards for Breed classification categories, considering the inclusion of breeding values in sale catalogues and classification standards. The performance standards set for stud rams in the tests were not sufficient for rams classed as stud to carry exceptional performance records.

The testing of Dorper Veldrams has been discontinued in Namibia from 2003 with the withdrawal of the Ministry of Agriculture. Current regional and national Dorper ram auctions include no or only limited performance records indicating a danger for regression in the progress of scientific Dorper breeding in Namibia. Scientific advancement is further impaired by the low number of Dorper sheep being performance tested compared to the number of breeding rams required per year (Von Schauroth, 2007; 34).

If ram buyers exert influence on stud breeders to impart performance records, ram breeders will comply quicker. Some ram breeders perceive Veldram tests as too expensive an exercise.

The actions of some participating farmers in the 22 Veldram tests, not complying with some prerequisites, by not supplying ram birth dates, or trying to manipulate performance by feeding manipulation of young rams in advance of tests (Von Schauroth, 2007:4) and the lack of progress in this regard over the 15 years' duration of Veldram testing in Namibia, indicates a perception of low value ascribed to performance testing by stud breeders of Dorper rams in Namibia.

Progress in enrolment in performance testing/recording in neighbouring RSA with many Dorper breeders is slow, and Namibian breeders having a historic relation with Dorper breeding in the RSA may well move at the pace of the RSA industry. The advancement of scientific breeding and the use of breeding values at sales of rams in the Merino breed may well become a catalyst for progress with Dorper breeders.

Positive indications are that during a workshop held in October 2004 to discuss a proposed Namibian National Small Stock Development Programme (NSSDP) (2004) with the industry, farmers requested that they prefer that an objective body such as the Government supervise centralized tests rather than for individual or groups of farmers to execute the test themselves. Furthermore, it was also requested that more than one test station should be established all over the country to test ram performance in all broad resource areas.

It need also be emphasized that Veldram performance records, *in situ*, mainly evaluate the ram on growth and frame size. The biological implications of growth performance on end mass and feed intake need be considered (Groenewald, 1992; 47). The influence of reproduction on flock economics is of crucial importance (Neser, 1999; 28-33) and need to be made available for rams put on Veldram auctions.

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