

## **PROMOTING THE PURCHASING OF PERFORMANCE TESTED DORPER RAMS: THE ROLE OF AGRICULTURAL EXTENSION**

Fourie, P. J.<sup>7</sup>

### ***ABSTRACT***

The sale price of 868 Dorper rams sold between 2004 and 2013 were compared with their measured performances. The independent variables (Selection, Weaning Index, Wean direct, Wean maternal, Post wean, Breeding value for number of lambs weaned (GLS), Relative economic value (REV), Selection Index percentage (SI%), Scrotal deviation (SD), Mean Lamb Index (MLI) and Ewe productivity Index (EPI) were used to predict the dependent variable (sale price of the Dorper rams) from 2004 to 2013. Factors with the most significant influence in order of importance were selection (stud or commercial), SI% and REV. It is evident that rams with better performance figures fetched higher prices. Although buyers did consider breeding values when buying rams none of it consistently contributed to sale price. It appears that buyers rather responded on SI%, a performance parameter familiar to them which was displayed in the sale catalogue from the beginning of the project. In an extension approach performance data must form the base for convincing breeders and farmers to move towards more scientific breeding methods, combining visual evaluation with measured performance at all Dorper sales. A unified effort by research, extension and the Breeders' Society may address the problem best.

**Keywords:** Dorper veld-ram clubs, performance measurements, Sale Price, Agricultural extension

### **1. INTRODUCTION**

Over the past decades Dorper sheep has shown that they are good converters of natural pastures into meat and that they have very good quality carcasses. The review of Cloete, Snyman & Herselman (2000:132) has shown that the Dorper is an adaptable sheep, capable of maintaining acceptable levels of production under a wide variety of conditions. These are some of the reasons why the Dorper is world- renowned. For many years however, the Dorper breed has emphasized more on subjectively assessed traits such as conformation, type, size, fat distribution and colouring during the selection of breeding sires and dams (Olivier & Cloete, 2006:13). Animals were selected mainly on breed standards and their achievement in the show rings where a symmetrical structure and muscling is important. Measured performance in a natural production environment does not play a role in the judging of the breed at production, club and national sales (Olivier, 2005:40). More emphasis should be placed on recording objective traits as these have a more pronounced impact on profitability (Zishiri, Cloete, Olivier & Dzama, 2013). Furthermore, an increasing tendency to raise animals under artificial conditions, has led to animals with poor adaptability to extensive conditions (Campbell, 1974:16; Nesor, Konstantinov & Erasmus 1995:65).

All these factors contributed to the creation of veld-ram clubs in the 1980's. In these clubs, Dorper rams (3-6 months of age) of different breeders are performance tested as a group for 150 days on natural veld, commencing shortly after weaning. On conclusion of the test

---

<sup>7</sup> Department of Agriculture, Central University of Technology, Free State, Private Bag X20539, Bloemfontein, 9300, Republic of South Africa. Email address: [pfourie@cut.ac.za](mailto:pfourie@cut.ac.za)

period animals are sold at approximately 12 months of age. At some of these auctions the breeders remained anonymous until the rams have been sold. This keeps the emphasis on the performance of the animal, instead of the breeder. The main advantage is that the buyer is purchasing a ram that has been selected for traits of economic importance, and which is adapted to those specific and similar environments in which it is expected to perform (Fourie, Nester & Van der Westhuizen 2000:128). For many years performance indexes were the only indication of animals' performance at these sales. Currently several breeding values are also displayed in sale catalogues. Fourie & Van Rooyen (2013:28) suggested that pelvic measurements must also be reflected in the catalogues.

Veld-ram clubs are in most cases the only place where buyers can buy performance tested animals having reliable performance data. At these auctions, measured performance is combined with phenotypic selection in the identification of superior sires. Despite of this valuable effort Olivier & Cloete (2006:14) report that the subjective selection of animals is still the basis of selection. In most instances, animals are culled on the basis of these traits. The possible expense of this selection criterion on economically important traits such as growth rate and reproduction is unknown. Net reproduction rate, defined as total weight of lamb weaned accumulated over the lifetime of a ewe, is by far the most economically important trait in small stock farming. Despite its importance, this trait is usually ignored during selection of replacements (Olivier, Cloete, Schoeman & Muller, 2005: 84).

Profit maximization in a sheep enterprise can be achieved mainly as a result of good net reproduction rate, maximum growth rate to slaughter and good quality carcasses produced under natural veld conditions (Zishiri, Cloete, Olivier & Dzama, 2013). The Dorper Breeders Society's ability to produce genetically superior sires is therefore questioned. Commercial and stud farmers who are often keen to pay exceptionally high prices for over conditioned rams without any performance figures makes participation in veld-ram projects less attractive for stud breeders. It is also suspected that some of the buyers at these auctions are not familiar with the performance figures displayed in the sale catalogue. Currently the SA Dorper breeders' society does not stress the performance testing of animals enough. The transfer of important technical data may be executed by extension services.

The downsizing in research budgets and resources and the re-focus of extension services pose a serious challenge to the solution of this problem for Dorper farmers and breeders in specific. This put even a higher obligation on agricultural extension, research and farmers to unify their efforts in addressing the complex issues concerning sheep farming.

Against this background, the questions that arise are, to what extent does the performance of the animals in the veld-ram club influence the prices buyers are prepared to pay for these animals and did performance figures and breeding values become more important to buyers over the past decade? The paper also stresses the important role of agricultural extension in the education of prospective ram buyers.

## **2. MATERIALS AND METHODS**

### **2.1 Description of the environment**

The Griekwastad veldram project was established in 1983 and is the oldest of its kind in South Africa. Animals are raised in the Niekerkshoop/Prieska area. The veld type that covers

most of the Griqualand West region consists of sweet-mixed bushveld on rocky soil. The rainfall, occurring in summer, ranges from 250mm to 350mm, and is very irregular. In summer the climate is hot, while the winters are very frosty. The vegetation consists of a large variety of grasses and bushes including *Themeda triandra*, *Cymbopogon plurinodis*, *Aristida diffusa*, *Stipagrostis uniplumis*, *Eragrostis lehmanniana*, *Eragrostis obtusa*, *Stipagrostis obtusa*, *Stipagrostis uniplumis*, *Rhigozum trichotonum*, *Acacia mellifera*, *Erricephalus ericoides*, *Lyccium cenereum* and *Pentzia globosa* (Elser, Milton & Dean, 2006:3).

## 2.2 Data

The auction prices of 868 Dorper rams, sold between 2004 and 2013 at the Northern Cape veld-ram club, were used in the study. The performance data published in the sales catalogues consist of a combination of indexes and breeding values. The following information was available to the buyer in a catalogue: lot number of the animal, birth date, selection index, scrotal circumference deviation (2004-2008). The data for 2009 was excluded from the data set as breeding values were not complete and not very reliable at that stage. As from 2010 a combination of indexes and breeding values were displayed for the first time: Birth status, Weaning index, Wean direct, Wean maternal, Post wean, Breeding value for number of lambs weaned (GLS%), REV, MLI and ewe productivity index (EPI). Noticeable results in different production traits of sheep can be achieved through selection on breeding values in Afrino sheep (Snyman, 2009:4) and Merino sheep (Cloete, Gilmour, Olivier & Van Wyk 2004:754) has been reported. The selection (conformation score) of all the rams were indicated by means of a colour code on the heads and backs of the rams.

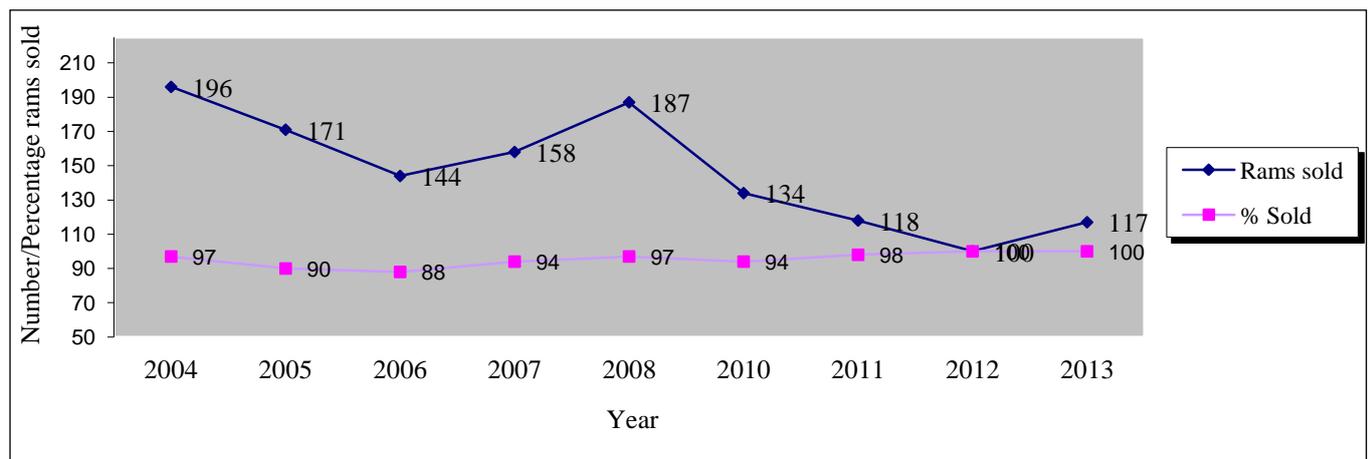
The data of the veld ram projects is processed by the ARC and performance figures are calculated, however, these performance figures and its importance are poorly transferred to the farmer. This gap should be bridged by agricultural extension in collaboration with research and the breeders' society. Stevens & Terblanche (2004:40) suggested that the role players should move towards a partnership in agricultural technology generation and dissemination. They further suggested that agricultural researchers, extension staff and farmers become partners in agricultural technology generation and dissemination.

From 2004 a type 4 stud ram is defined as an animal with above-average conformation and a selection index of 95 or more obtained during the performance test. These rams should also have a scrotal circumference deviation (deviation from average) of  $\geq -3$ . A commercial ram is an animal with fair conformation and no disqualifications, a selection index of  $\geq 85$  and a scrotal circumference deviation (deviation from average) of  $\geq -3$ . Commercial rams must also comply with the minimum performance requirements of the test. A merit ram is defined as a ram with above average conformation, a selection index (comprising of final test weight and ADG) of 115+ and a Scrotal Deviation (SD) of +1. From 2010 for breeding values (wean direct, wean maternal, post wean direct and GLS) the ram must also be in the top 40% of the breed during the performance test. At the end of the performance test (June) these rams must have had at least a type 4 (stud) conformation while its conformation on the final inspection, one week prior to the auction has to be type 4 or type 5. In Table 1 the general statistics of the Northern Cape veld-ram project are presented.

**Table 1: General statistics of the Northern Cape veld-ram club.**

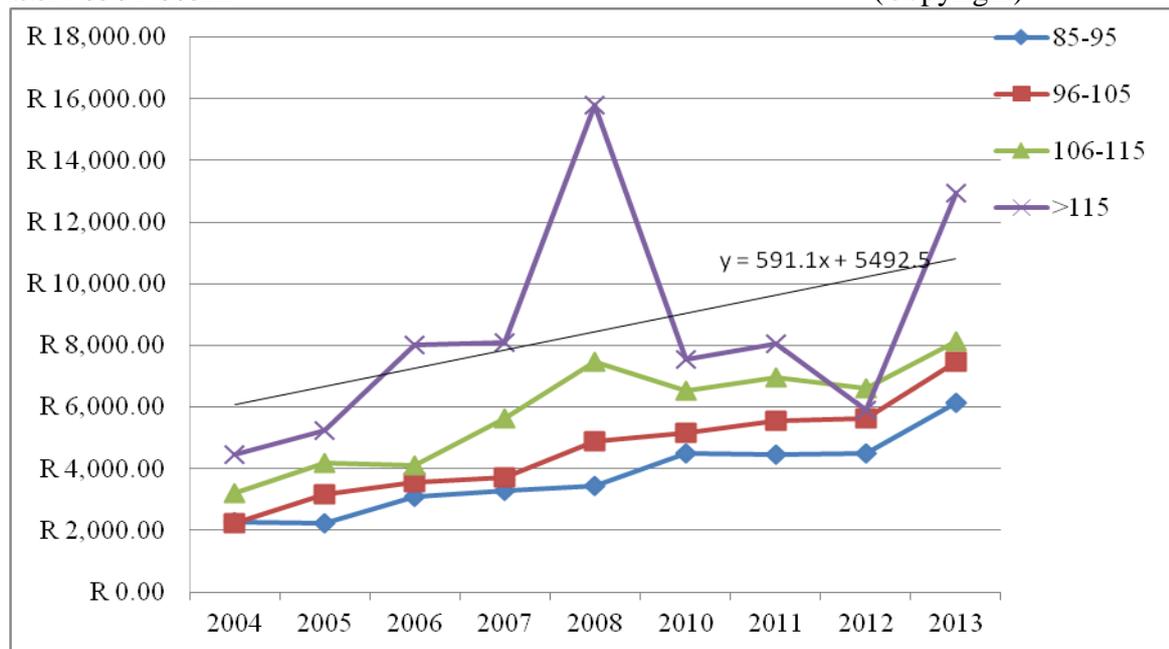
Year	Intake	Sale numbers			% Rams sold
		Commercial Rams	Stud rams	Merit rams	
2004	295	149	47	0	97
2005	322	126	44	1	90
2006	345	126	14	4	88
2007	280	121	35	2	94
2008	295	133	47	7	97
2010	333	91	29	14	94
2011	377	87	23	8	98
2012	310	88	11	1	100
2013	234	93	23	1	100
Total	2791	1014	273	38	

From Table 1 is clear that only 10% of the rams taken in qualified as stud rams, while less than two percent qualified as merit rams. During the period five percent of all animals died, while another six percent were culled on reproduction and conformation disorders. For a more complete description of the data and management practices in the Dorper veld-ram clubs, research conducted by Fourie (1999) can be consulted.



**Figure 1: The number and percentage Dorper rams sold from 2004-2013 at the Northern Cape veld ram club.**

From Figure 1 it can be seen that the percentage rams sold between 2004 and 2013 (excluding 2009) ranged between 88-100%. According to the study of Fourie, Nesor & Van der Westhuizen (2000:128) 1603 rams were sold from 1990-1999 at this club, signifying that significantly less Dorper rams were sold over the past decade. At this auction other mutton breeds like the Van Rooy and Meatmaster has become popular.



**Figure 2: The effect of Selection Index Percentage on mean price (R) from 2004-2013.**

From Figure 2 above it is clear that rams with higher selection indexes fetched higher prices from 2004-2013. The elevated prices paid for rams with a SI% of >115 reflects the priority these buyers put on the performance of rams. This is in agreement with the results reported by Grobler, Jordaan, & Van der Rijst (2011).

### 2.3 Statistical Methods

The independent variables (Selection, Wean Ind, Wean dir, Wean mat, Post wean, GLS, REV, SI%, SD, MLI and EPI) were used to predict a dependent variable (sale price of the Dorper rams) from 2004 to 2013. Certain independent variables Wean Ind, Wean dir, Wean mat, GLS, REV and MLI (for 2004-2008) were not measured. A forward stepwise regression (specifying significant level for variables to enter the model as 10% and to stay in the model as 5%) was performed for each year in order to select the most favourable independent variables that predict the price of Dorper rams. Table 2 and Table 3 show the probabilities and percentages of selected variables that entered and stayed in the model respectively. All Data Analysis was done using SAS/Stat Statistical Software (SAS, 1999).

## 3. RESULTS AND DISCUSSION

Table 2 below gives the probabilities of the independent variables selected to predict price. The independent variables used from 2004 to 2008 were Selection, SI% and SD. These variables showed significant ( $P < 0.05$ ) influence in predicting price in all years (2004 to 2008) except SD which only influenced price in 2004.

The table also depicts that from 2010 to 2013, the independent variables that significantly influence price were Wean direct and SI% in 2010; Selection, Wean maternal and MLI in 2011; Selection, REV, SD in 2012 and Selection, Weaning Index, REV and SI% for 2013. GLS did not play significant role in predicting price from year 2010 to 2013.

**Table 2: Independent variable to predict the price selected.**

Year	Selection	Wean Ind	Wean dir	Wean mat	Post wean	GLS	REV	SI%	Scrotal dev	MLI	EPI
2004	**	-	-	-	-	-	-	**	*	-	-
2005	**	-	-	-	-	-	-	**	NS	-	-
2006	*	-	-	-	-	-	-	**	NS	-	-
2007	**	-	-	-	-	-	-	**	NS	-	-
2008	**	-	-	-	-	-	-	**	NS	-	-
2010	NS	NS	**	NS	-	NS	NS	**	NS	NS	-
2011	**	NS	NS	*	-	NS	NS	NS	NS	*	-
2012	**	NS	NS	NS	-	NS	**	NS	**	NS	-
2013	**	**	NS	NS	-	NS	**	**	NS	NS	-

NS = Not significant; \* = P<0.05; \*\* = P<0.01; - = Not measured

In Table 3 below the contribution (in percentage) of individual effects on auction prices, using a stepwise regression analysis, between 2004 and 2013 is illustrated. Each year was analysed separately to establish trends over time. Selection contributed in all years except in 2010. From 2004 to 2008, Selection had the highest percentage contribution in 2004, 2005 and 2007 with the percentage of 80.24, 70.58, and 88.86 respectively, while SI% was the second largest contributing factor in these years. SI% showed a significant contribution in all years except in 2011 and 2012. From year 2004 to 2008, SI% only had the highest percentage in 2006 and 2008.

Table 3 also shows that from year 2010 to 2013, SI% contributed more in 2013 and was the second contributing factor in 2010 after Wean direct that had the percentage contribution of 73.83, while selection showed no significant influence. In 2011 and 2012 selection had the highest contribution percentage with Wean maternal, MLI, REV, and SD contributing less than 30% each. GLS made no contribution on price during the entire study period.

**Table 3: Partial percentage declaration of each independent variable included in the model per year.**

Year	Selection	Wean Ind	Wean dir	Wean mat	Post wean	GLS	REV	SI%	Scrotal dev	MLI	R <sup>2</sup>
2004	80.24	-	-	-	-	-	-	17.57	2.19	-	0.5698
2005	70.58	-	-	-	-	-	-	29.42	NS	-	0.5514
2006	15.24	-	-	-	-	-	-	84.76	NS	-	0.4022
2007	88.86	-	-	-	-	-	-	11.14	NS	-	0.4219
2008	16.84	-	-	-	-	-	-	83.16	NS	-	0.5029
2010	NS	NS	73.83	NS	-	NS	NS	21.68	NS	NS	0.286
2011	78.74	NS	NS	9.21	-	NS	NS	NS	NS	12.07	0.3495
2012	63.64	NS	NS	NS	-	NS	26.07	NS	10.27	NS	0.4607
2013	18.15	20.03	NS	NS	-	NS	9.77	52.07	NS	NS	0.4778

All variables included in the model were significant at P<0.05; - = Not measured and NS = Not significant

Although weight was not indicated in the sale catalogue it was clear that the bigger and heavier rams were favoured by some buyers. The results of Lester, Notter, & McClure,

(1983:47); Snowden & Shelton (1985:6), Fitch, Butler, Golden & Denham (1986:212); Fowler, Baertsche & Davis (1987:); Poggenpoel (1989:51) and Maxa, Borchers, Thomsen, Simianer, Gauly, & Sharifi (2009:11) showed a high influence of live weight on the auction price of rams.

Scrotal circumference deviation affected the price only in 2004 and 2012. Fourie, Nesor & Van der Westhuizen (2000:130) reported that scrotal circumference only had a significant influence on auction price in four out of the ten years. By considering  $R^2$  it can be seen that a fair percentage of the variation could be declared since 2004.

Ewe efficiency parameters (GLS, EPI & MLI) influenced price only once. In this regard Nesor, (1999:28-33) stresses that the influence of reproduction on flock economics is of crucial importance and need to be made available for rams sold, disclosing all breeding values related to production and reproduction.

#### **4. CONCLUSION**

The results of this study agrees with earlier findings that that performance does play a significant yet combined role in determining sale prices of rams. The influence of SI%, which mainly reflects how well a ram has grown and adapted on the veld was significant in seven years. This is in agreement with the results reported by Fourie, Nesor & Van der Westhuizen (2000:131) for this project and Grobler, Jordaan, & Van der Rijst (2011:6) for the Namibian veld-ram club.

It is also evident that conformation is still important to buyers. Especially rams having good performance figures as well as a good conformation fetched high process. At this project stud rams also have to comply with certain minimum performance figures, which may diminish the possible negative effect of too much emphasis put on conformation by certain buyers.

Although buyers did consider breeding values when buying rams, none of the factors consistently contributed to sale price. It appears that buyers rather responded on SI%, a performance parameter familiar to them and which was displayed in the sale catalogue from the beginning of the project.

#### **5. EXTENSION IMPLICATIONS**

The message the extension authorities must communicate is that the selection of rams based only on conformation may be detrimental for genetic improvement over the long term. As the extension officer is particularly well positioned they can play a significant role in conveying the outcome of this study to breeders, developing farmers and commercial farmers through knowledge facilitation, workshops, study groups and farmer days. Kofman & Senge (1993:23) found that farmers who are involved in farmer organisations and study groups were more likely to adopt new practices in agricultural development. Stevens & Terblanche (2004:49) also regard effective farmer groups as a prerequisite for accelerated agricultural development in South Africa. It can become the “vehicle” to work collectively towards change at farm level and can help with the empowerment of farmers.

The conformation and visual appearance is important for breeders and farmers, consequently the breeder is obliged to breed animals that will not only satisfy buyers as far as breed standards are concerned, but in future the animals must also have the necessary performance

figures. In an extension approach performance data must form the base for convincing breeders and farmers (also on club level) to move towards scientific breeding methods, combining visual evaluation with measured performance at all Dorper sales.

The advancement of scientific breeding and the use of breeding values at sales in the Merino breed may be used as a vehicle in extension programs to promote a more scientific approach. It is however paramount that the breed inspectors who's main task is the phenotypic selection of animals be part of this endeavour. As leaders of the industry they should take hand with extension.

Therefore, the deliverance of an extension service which focuses on a more balanced selection method enlightening the advantage of performance tested rams for accelerated improvement related to adaptability, growth and reproduction is imperative. An integrated and well co-ordinated agricultural extension programme, driven by a team of trained and knowledgeable specialists in the field of animal production could render the much-needed momentum towards economic sheep production. This may flow over to neighbouring Namibia with which South African Dorper breeders have a long history.

## REFERENCES

- CAMPBELL, Q. P. 1974. A study of breeding problems in the Dorper sheep. D. Sc. Thesis, U.O.F.S., Bloemfontein.
- CLOETE, S. W. P. & DE VILLIERS, T. T. 1987. Production parameters for a commercial Dorper flock on extensive pastures. *S. Afr. J. Anim. Sci.*, 17: 121-127.
- CLOETE, S. W. P., SNYMAN, M. A. & HERSELMAN, M. J. (2000). Productive performance of Dorper sheep. *Small Rum. Res.*, 36: 119-135.
- CLOETE, S. W. P., GILMOUR, A. R., OLIVIER, J. J. & VAN WYK, J. B. 2004. Genetic and phenotypic trends and parameters in reproduction, greasy fleece weight and live weight in Merino lines divergently selected for multiple rearing ability. *Aust. J. Exp. Agric.* 44, 745-745.
- ELSER, K. J., MILTON, S. J. & DEAN, W. R. J. 2006. Karooveld- Ekologie en Bestuur. Briza, Pretoria.
- FITCH, G. Q., BUTLER, J. G., GOLDEN, B. L. & DENHAM, A. H. 1986. Identification of characteristics influencing sales price on performance-tested ram lambs. *J. Anim. Sci.* 63 (Suppl.1):212 (Abstr.)
- FOURIE, P. J., NESER F. W. C. & VAN DER WESTHUIZEN C. 2000. Relationship between performance measurements and sales price of Dorper rams in the Northern Cape veld-ram club. *S. Afr. J. Anim. Sci.*, Vol. 30 (2):128-132.
- FOURIE, P. J. & VAN ROOYEN, I. M. 2013. The suitability of linear body measurements for the prediction of pelvis area in Dorper sheep. *Journal of New Generation Sciences.* Vol. 11 no 3, 18-28.
- FOWLER, K. F., BAERTSCHE, S. R. & DAVIS, M. E., 1987. An evaluation of the factors affecting sales price in performance-tested rams. *Sheep Indust. Dev. Res. Digest.* 3 (2):19.
- GROBLER, H. J. F., JORDAAN, J. W. & VAN DER RIJST, M., 2011. Factors affecting the auction price of Veldram performance tested Dorper rams in Namibia. *S. Afr. J. Agric. Ext.* Vol. 39 Issue: 2 Pages: 1-14
- KOFMAN, F. & SENGE, P. M. 1993. The link between individual and organizational learning. *Organizational Dynamics*, 22: 5-23.

- LESTER, D. C., NOTTER, D. R. & McCLURE, W. H. 1983. Factors affecting sale price of performance-tested yearling rams. *J. Anim. Sci.* 57 (Suppl.1):47 (Abstr.)
- MAXA, J., BORCHERS, N., THOMSEN, H., SIMIANER, H., GAULY, M. & SHARIFI, A. R. 2009. Auction price of Texel, Suffolk and German white-headed mutton rams: A genetic-statistical study. *Small Rum. Res.* 85: 105-110.
- NESER, F. W. C., KONSTANTINOV, K. V. & ERASMUS, G. J. 1995. Estimated genetic trends for weaning weight in three Dorper lines with different selection criteria. *S. Afr. J. Anim. Sci.* 25:65.
- NESER, F.W.C., 1999. Selection for growth and adaptation in sheep. Small stock improvement: New Millenium- New Challenges ARC Improvement Institute, Irene: 28-33.
- OLIVIER, J. J., 2005. Kan die mooier maak van Dorpers nadelig wees? Dorper nuus, Vol. 64:39-42
- OLIVIER, J. J. & CLOETE, S. W. P., SCHOEMAN, S. J. & MULLER, C. J. C. 2005. Performance testing and recording in meat and mutton goats. *Small Rum. Res.*, 60: 83-93.
- OLIVIER, J. J. & CLOETE, S. W. P. 2006. Genetic Analysis of the South African Dorper sheep. Presentaion at the 8<sup>th</sup> World Congress of Genetics Applied to Livestock Production, 13- 18 August, Belo Horizonte, MG Brazil.
- POGGENPOEL, D. G. 1989. Verband tussen prestasiemetings en veilingspryse van Veldmerinoramme. *S. Afr. Tydskrif. Veekunde* 19(1): 50-52.
- SAS INSTITUTE, INC. 1999. SAS/STAT User's Guide, Version 9, 1st printing, Volume 2. SAS
- SNOWDER, G. D. & SHELTON, M. 1985. Factors affecting sales price of performance-tested Rambouillet rams. *Sheep Indust. Dev. Res. Digest.* 2(1):6.
- SNYMAN, M. A. 2009. Investigation into production and reproduction selection criteria in Afrino sheep. Grootfontein Agricultural development Institute. Research report3-4.
- STEVENS, J. B. & TERBLANCHÉ, S. E., 2004. Sustainable agriculture development through effective farmer groups. *S.Afr. J. of Agric. Ext.* Volume: 33 Pages: 40-49.
- ZISHIRI, O. T., CLOETE, S. W. P., OLIVIER, J. J. & DZAMA, K. 2013. Genetic parameter estimates for subjectively assessed and objectively measured traits in South African Dorper sheep. *Small ruminant research*, 109: 84-93.