The South African National Small Stock Improvement Scheme

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Introduction

The economic viability of any business is dependent on the number and quality of the products it produces, the cost to produce the products and the price paid for the product. The South African sheep and goat producers have no influence on the price paid for their products. In order to survive economically, they must produce more at lower cost. To achieve this, the hardiness, adaptability and survival rate of their animals are of the utmost importance. It was for these reasons that the Dorper and Boer goat breeds were developed and became popular, not only nationally but also internationally.

Breed standards and characteristics were the major focal points of most of the sheep and goat breeders in South Africa during the last few decades. The main aim was thus to breed national champions and/or rams that would fetch record prices at auctions. Buyers from communal areas compared their animals against these big and well-managed animals and were willing to purchase these animals.

Some breeders are concerned that the breeds may loose some of their desirable attributes (hardiness, adaptability and reproductive ability under adverse conditions) due to the emphasis placed on breed standards and shows. The aim of the National Small Stock Improvement Scheme (NSIS) is to genetically improve economic production traits in a 'holistic' manner while breed standards are maintained. This means that the perceptions of breeders have to be changed to focus on traits of monetary value to their clients (commercial producers and not other stud breeders, at present). With this in mind, the most important trait to be improved is net reproduction rate under natural production environments. The shortening of the production cycle while maintaining fibre traits and/or carcass quality is also of major economic importance. The improvement of these traits has to be achieved in animals with an acceptable conformation and conforming to minimum breed standards.

For a performance testing scheme to be successful, a minimum number of relevant records has to be kept. Also the results to be interpreted by breeders and their clients have to be as simple and as understandable as possible. Commercial farmers are not concerned with breed improvement, and would prefer one (preferably objective) value describing the 'best' animal in terms of monetary yield. The standardisation of performance results would also avoid confusion among stud breeders and commercial farmers. With the development of the NSIS, these and other principles were kept in mind.

Selection for reproduction rate

With the current economic environment in South Africa, reproduction is by far the most important trait in sheep farming. Net reproduction rate per ewe (defined as total weight of lamb weaned, accumulated over the lifetime of a ewe) can be increased by improving some or all of its components. Heritability estimates for net reproduction rate in South African Merino and Afrino

flocks ranged from 0.13 to 0.26 (Snyman et al. 1997). It was possible to demonstrate that litter weight weaned per ewe increased by 0.69 kg per year where both rams and ewes were selected on the basis of total weight of lamb weaned (Ercanbrack and Knight 1998). Selection for total weight of lamb weaned would also, in theory, keep reproductive rate within optimum bounds. Selection would be directed against a component of reproduction where undesirable change would result in a reduction of either lamb or ewe fitness, expressed as a reduction in litter weight weaned per ewe (Ercanbrack and Knight 1998).

Under the extensive conditions typical of the South African production environment, optimal net reproduction per flock within the constraints of the environment is important. In years of drought and in arid regions, the environment often cannot support marked increases in litter size. In such cases the quality of the lambs produced may become more important than the number of lambs produced by ewes. The major objective of the NSIS is therefore to increase the marketable weight of lamb produced per ewe. Huge variation was recorded within a flock for this trait (see Figure 1). All the ewes incorporated in Figure 1 were maintained in the same environment, they were mated at the same time and reared their lambs on the same pasture. The best 17 ewes (out of a total of 126) weaned on average 203 kg of lamb per ewe over a period of four production years as compared with 48 kg of lamb weaned by the poorest 15 contemporaries. The difference between these two groups amounted to 38 kg of lamb/ewe per year.

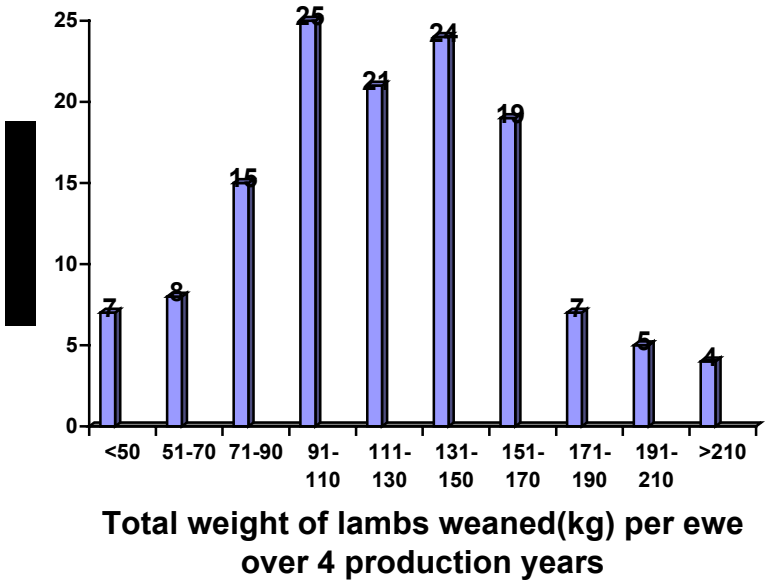

Figure 1. *The distribution of total weight of lamb weaned/ewe for ewes born in the same year and season and that survived four lambing opportunities each.*

It is feasible to record weaning weight at 100 days of age since the number of animals normally culled before this age is negligible. The recording of weaning weight forms the basis of the calculation of total weight of lamb weaned per breeding ewe. Age differences within a flock are

accounted for by the regression of total weight of lamb weaned per ewe on her number of productive years. The number of productive years is calculated from the date of the last lambing (or the last possible lambing date for ewes that were barren in the reference year) and her own birth date. The weaning weights of individual lambs are adjusted for age and sex prior to the computation of weight of lamb weaned per breeding ewe. Total adjusted weight of lamb weaned per ewe is subsequently presented as a deviation from the mean of all the ewes within the same lambing season and present in the breeding flock for the same number of production years. This enables the comparison of ewes irrespective of age and production level. These calculations result in a single measure of excellence in a breeding ewe, which is easily interpreted by both stud breeders and commercial farmers. Selection against poor producers is likely to result in current gains as well as gains in future generations.

Selection for growth

Selection for growth is important to enable the shortening of the production cycle. Growth under natural production environments can also be an indication of adaptability, particularly in the adverse South African environment. Weaning weight as such can potentially be used as a selection criterion for growth. It is, however, of low heritability and is also influenced by maternal effects. Live weights at older ages, however, have certain disadvantages as selection criteria, because of preliminary culling and resultant small contemporary groups. It is therefore recommended to record an additional weight at 270 or 365 days of age as a measurement of post-weaning growth. To avoid confusion among commercial farmers, it was decided to combine the 270- or 365-day weight and weaning weight in a selection index with equal economic weights. Weights are adjusted for age, rearing status and age of the dam. Within contemporaries, subgroups (lambs born in same season but managed as different groups) are allowed. Age differences between individuals within a contemporary are limited (between 75 and 150 days for weaning weight etc.).

The reproductive performance of the dam of the animal, namely the deviation in total weight of lamb weaned per breeding ewe compared with contemporaries, is also supplied as additional information on the growth reports.

Selection for fibre traits

The existing wool performance scheme is incorporated into the new NSIS. It provides body weight after shearing, fleece weight, fibre diameter, staple length, crimp frequency and clean yield. Body weight, clean fleece weight and fibre diameter can be combined (and animals ranked) in a selection index according to individual participant's breeding objectives.

Research in Australia (Greeff et al. 1999) showed a correlation of –0.47 between the coefficient of variation (CV) of fibre diameter and staple strength. Due to the additional cost of measuring staple strength, the deviation of CV of an animal from the mean CV is also calculated and can be used as indirect selection for stronger staple strength. As in the case of growth traits, reproduction performance of the dam is also supplied in the fibre reports.

Recording system

At present, most participants already record parentage, sex, birth type and date. Additional information to be recorded includes weaning weight and date, as well as 270- or 365-day weight and date. Both reproduction and growth can be computed from these records. No carcass traits on live or slaughtered animals are presently being recorded, mainly due to associated costs. However, investigations are under way to incorporate carcass traits into the scheme.

The major prerequisite for a viable livestock recording system is correct identification of contemporary groups. A contemporary group is defined as all animals born on a farm within a mating season, limited to 60 days. Within this group, subgroups for different management strategies are allowed, provided that a specific minimum number of animals is included in each subgroup. Presently participants are being advised on the importance of correct identification of contemporary groups. Currently also the adaptation and availability of computer software for on-farm recording of data has high priority.

Different levels of participation are catered for depending on the amount of data available and also the level of recording. The records required are the following.

Member number:	unique number allocated to each participant by the system for address and other details.
Breed code:	a unique number supplied for each breed.
Herd code:	a unique code for each flock of each participant.
Dam ID:	the number of the lamb's mother in the format flock code, year and sequence number (FFFF YY NNNN). Mandatory for reproduction and BLUP (Best Linear Unbiased Prediction).
Sire ID:	Sire of the lamb, also in the format flock code, year and sequence number. Mandatory for sire summary and BLUP.
Service code:	for natural mating with your own ram = 1, artificial insemination (AI) = 3 and involution = 4. It is important to indicate that a lamb is an embryo lamb in order to accurately calculate the reproductive ability of the dam. Optional.
Birth remarks:	natural birth = 1; abortion before 4 months = 2; abortion after 4 months = 3; stillborn = 4; dead at birth = 5; destroyed = 6; lamb alive but not identified = 18; ewe died at birth = 19; and ewe mated but did not lamb = 20. Mandatory for reproduction reports.
Lamb number:	the format is flock code, year and sequence number.
Sex:	ewe = 1, ram = 2.
Birth dates:	YYYY/MM/DD. Mandatory for pre- weaning and weaning weights.
Birth status:	single = 1; twins = 2; triplets = 3 etc.
Age of dam:	less than 30 months = 1; older then 30 months = 2.
Birth weight:	optional.
Weighing code:	pre-weaning weights, code 1; weaning weight code 2; post-weaning weight (at 270 days) code 3; and mature weight code 4.
Environmental code:	veld = 1; feedlot = 2; pastures = 3; veld and supplementation = 4; pastures and supplementation = 5; veld 75% and pastures 25% = 6; veld 50% and pastures 50% = 7; and veld 25% and pastures 75% = 8.

Management group:	it is of utmost importance to record any animals that have been treated differently, separately. If twins have been separated from singles in different camps it is not necessary to record it. If twins and singles are in one flock, but in different camps, this should be recorded by allocating different management codes, e.g. Camp A is management group 1 and camp C3 is management group 2.
Rearing status:	weaned as single = 1, twin = 2, etc. If hand-reared = 9 - important the ewe will not be credited for this lamb.
Weigh date:	YYYYMMDD
Weight	recorded in kg.
Scrotum circumference:	recorded in cm. Optional.
Grade:	can be a visual description or code according to the type/conformation of the animal. Optional.

For fibre data a sample of 50 g, and the greasy fleece weight (if available) must be submitted for analysis

Central testing of rams

The central testing of rams on natural pasture forms an integral part of testing rams for growth traits (referred to as veld ram tests in South Africa). At present, five tests are in operation at various locations throughout South Africa. Because of age differences at the start of tests, as well as marked differences in initial live weight at the commencement of a trial, all tests must conform to specified criteria. The testing period must exceed 140 days, following an adaptation period of at least 14 days. The difference in the initial live weights of all the rams in a group is not allowed to exceed 12 kg, and all rams must be born within a 60-day period. The minimum number of rams per test group is 20 and an average daily gain exceeding 50 g has to be achieved over the test period.

According to a study by Fourie (1999), the objective information available to prospective buyers at the time of the public auction of the veld rams had little effect on sale price. One of the reasons for this was the fact that objective information changed from time to time. In general, heavier rams normally fetched higher prices. This tendency forced breeders to feed their rams in the pre-testing period to ensure a higher body weight at intake onto the trial, which was eventually reflected in a higher weight at the end of the test. To combat this, a maximum intake weight was set at 50 kg for all tests.

The correlation between results in a central test (under feedlot conditions) and progeny performance in a commercial environment was found to be less than 2% for Suffolk sheep in the mid-western USA (Waldron et al. 1990). In a preliminary investigation, the progeny of three Dorper rams with an average selection index 22% higher than the mean of their contemporaries was compared with that of three low index contemporaries. The index was a combination of average daily gain and body weight at the end of the test. These rams were mated to a total of 300 commercial ewes (150 ewes to high and 150 ewes to low index rams) and the progeny were raised under extensive conditions. At weaning age, progeny of the high index rams were 2.14 kg

(9%) heavier than progeny of the low index rams. This investigation is now being extended to other breeds.

As for weaning weight and 270-day weight, the reproductive performance of the dams of rams subjected to central testing is also available.

Flow of data

Progeny data received from participants have to be in a prescribed format. Each animal should have a unique identity, consisting of its breed code, stud number, year of birth and sequence number. Sire and dam identities are mandatory for Best Linear Unbiased Prediction (BLUP) analyses. Birth status and date, rearing status, weight code, environment and management group, weaning and subsequent weights and dates are also mandatory. Birth weight, scrotal circumference and subjective grade score are optional records. Upon receipt of the data, checks are made for group size, weight and age limits, pedigree discrepancies (born as female, as male etc.), days between lambings and numerous other possibilities.

Data are stored in interlinked tables for pedigree information, ewe reproduction, lamb growth, fibre traits and central testing performance. Various reports are availed by accessing the appropriate table. Specific reports presently available on groups of animals or on an individual are as follows (contents of the reports are given in parentheses):

- Reproduction summary (all ewes available within the same mating period, averaged per age group).
- Ewe reproduction report (the number of times lambed, total number of lambs born and weaned, ewe reproduction deviation, average weight index of all lambs produced, age at first lambing and inter lambing period –see Appendix I).
- Growth (weaning and last recorded weight of a lamb, its sire and dam identities, the number of productive years of the dam, lambs weaned by the dam and her reproduction deviation—see Appendix II).
- Sire growth summary (the average index of the progeny of a sire in a specific contemporary group as well as the rest of his progeny).
- Fibre reports (body weight, clean fleece weight, fibre diameter, staple length, deviation of CV and reproduction performance of the dam—see Appendix III).
- Results from central tests (test age, daily gain, final test weight, scrotum deviation, an index combining daily gain and final weight, sire and dam identity, number of productive years, lambs weaned and reproduction deviation of the dam).

Client base

This scheme is available to all sheep and goat farmers in the SADC (Southern African Development Commission). Different levels of participation are available, from only the weights of five or more animals per group to across flock BLUP analysis. BLUP breeding values are dependent on the amount of information and linkages between contemporaries. Data can be submitted on paper as well as electronically. Reports are generated on paper and depending on the software available, are also available in electronic format. The usefulness of the reports is linked to the type and accuracy of the data received.

A cost of 0.45 South African Rand (R) (US$ 1 = R 9.15) is charged per weight analysed. For fibre analysis the cost varies between R 3.60 and R 5.00 per sample. BLUP analysis is more expensive and varies from R 200–500 per analysis.

Track record

The full scheme has been operational since April 1999 and currently 131 members representing 13 sheep and goat breeds are participating in the growth and reproduction sections. The scheme is available to all sheep and goat farmers on different levels of recording (from only the weights of animals to national BLUP analysis) and data submission (submitted by paper or electronically). Up until May 2000, data from 89,340 lambs with weaning weights and 34,158 ewes with reproduction records were available. Annually, approximately 60 thousand wool samples are received for fibre diameter and clean yield analysis.

Participants are reluctant to record post-weaning weights of lambs. The importance of this on the efficiency of selection needs to be clarified. The heritability of total weight of lambs weaned as well as its correlation with other production traits also needs to be investigated. The main stumbling block preventing better participation is the perceptions of breeders and their clients. In future, this must be addressed by appropriate training. The grouping of animals into contemporary groups, confusion with animals' identities, wrongly recorded sex and missing birth dates are some of the major data errors.

The lack of participation by communal farmers is a function of lack of appropriate training, missing identifications, small contemporary groups and lack of facilities (weighing scales). Most of these can be overcome by undertaking a form of nucleus breeding project whereby superior sires (bred under the specific communal environment) can be distributed among members.

Questions for discussion

- Why is total weight of lambs weaned per ewe used instead of lambs weaned per ewe?
- In what way are the reproduction performances of ewes of different ages compared?
- For what reasons are pre- and post-weaning weights combined into a selection index?

Conclusion

The NSIS is an uncomplicated scheme that is affordable and easily comprehended by both stud and commercial farmers alike. It emphasises the traits with the greatest monetary value under the current economic climate. Moreover, the system is evolving continuously, allowing the inclusion of new technology as it becomes available. In this way, the South African sheep and goat participants can be kept at the forefront of advances in the scientific breeding of small stock.

References

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Appendix I

National Small Stock Improvement Scheme
Reproduction Report

Owner:
Address:

Date: 10/05/2000
Member No: 123456

Flock No: 4567

FDM: 789
Reference No: 005990
Page 1

Breed = XXXXX

**1 Ewe ID	2 Poss. prod years	3 Times lambed	4 Number of lambs	5 Number weaned	6 **EPI dev.**	7 Mean lamb index	8 Age 1st lamb (months)	9 Inter-lambing period
888 94 057	3.0	3	4	4	**5**	103	24	367
888 94 059	3.0	2	4	3	**–7**	87	24	729
888 94 066	3.0	3	6	3	**–7**	89	24	367
888 94 067	3.0	2	4	4	**–1**	85	24	733
888 94 070	3.0	3	4	4	**1**	90	24	366
888 94 071	3.0	3	3	3	**0**	116	24	369
888 94 073	3.0	3	5	5	**15**	106	24	365
888 94 076	3.0	2	5	4	**1**	89	24	729
888 94 085	3.0	3	5	4	**5**	103	24	364
888 94 086	3.0	3	7	4	**–4**	74	24	364
888 94 097	3.0	3	4	2	**–7**	131	24	366
888 94 122	3.0	3	5	4	**6**	104	24	373
888 94 125	3.0	3	5	5	**11**	95	24	368
888 94 139	3.0	2	2	2	**–8**	124	24	722
888 94 157	3.0	2	4	4	**2**	94	24	731
888 94 161	3.0	1	2	1	**–20**	109	24	729
888 94 176	3.0	2	2	2	**–9**	123	24	725
888 94 181	3.0	3	4	3	**3**	127	24	364
888 94 187	3.0	2	4	3	**–4**	99	24	725
888 94 192	3.0	2	3	2	**–10**	112	24	715
888 94 196	3.0	3	5	5	**17**	109	23	366

**

1. Identity (ID) of ewe. Format is stud number, year of birth and sequence number.
2. The possible number of productive years of the ewe. It is divided into half-year intervals. This is calculated from the last lambing date and the birth date of the ewe.
3. Number of times an ewe actually lambed.
4. Total number of lambs born (dead or alive) to the ewe.
5. Total number of lambs weaned by the ewe.
6. (EPI) Ewe productivity index deviation. This is calculated from the mean ewe productivity index (EPI) (see value in 'Group Summary Report') for each productive year subgroup. For example, a value of 6 means that a ewe's EPI was 6 points above the average EPI for her age group.
7. The mean index of all her lambs. In this case the weights of her lambs were corrected for age and sex.
8. Age at first lambing.
9. Average inter-lambing period of the ewe.

Appendix II

National Small Stock Improvement Scheme
Animal Improvement Institute
Growth Performance Report

OWNER:

Address:

Date: 10/05/2000
Member No: 123456

Flock No: 4567

FDM : 789
Reference No : 005990
Page: 1

BREED = XXXXX Sex = Rams

1	2	3	4	5	6	7	8	9	10	11	12	13	14
Animal ID	RS	Weaning weight		Final weight		**SI%**	Scrot. dev	Grd	Dam ID	Prod years	Wean	**EPI dev.**	Sire ID
		Dev.	Index	Dev.	Index								
O6 98 810	2	–1.40	78	–0.90	95	**89**	–1	C	A6 94 370	1.5	3	**–7**	A6 94 323
O6 98 858	1	1.50	123	1.70	109	**113**	0	A	A2 95 51	1.5	2	**–13**	O6 97 51
O6 98 860	2	1.00	116	2.00	111	**112**	–2	C	A2 95 159	1.0	2	**6**	O6 97 51
O6 98 861	2	1.20	119	2.40	113	**114**	4	AA	A2 95 159	1.0	2	**6**	O6 97 51
O6 98 863	1	–0.60	91	–1.90	90	**90**	0	B	A2 95 45	1.5	3	**–6**	O6 97 51
O6 98 869	2	–0.70	89	2.20	112	**104**	3	A	A2 95 3	1.5	4	**5**	O6 97 51
O6 98 872	2	–1.70	74	–1.50	92	**85**	–3	C	A2 95 523	1.0	2	**–1**	O6 97 51
O6 98 873	2	–0.60	91	–1.30	93	**92**	1	B	A2 95 86	1.5	3	**–7**	O6 97 51
O6 98 874	2	–1.60	75	–3.70	80	**78**	3	C	A2 95 86	1.5	3	**–7**	O6 97 51
O6 98 880	2	–1.20	81	–0.40	98	**92**	–5	A	A2 95 122	1.5	5	**17**	O6 97 51
O6 98 883	2	0.30	105	1.30	107	**106**	0	A	A2 92 137	1.0	2	**2**	O6 97 51
O6 98 886	2	–0.30	96	–1.80	90	**91**	2	B	A2 92 186	1.5	4	**5**	O6 97 51
O6 98 889	2	1.60	124	1.50	108	**113**	1	C	O6 95 10	2.0	3	**0**	O6 97 51

1. Identity (ID) of animal.
2. Rearing status of animal.
3. Weaning weight deviation. This is the first weight recorded for the animal. In this case, it was weaning weight. The deviation is the corrected weight of the animal, minus the mean corrected weight for the group, multiplied by the heritability of the trait. In effect this value is a predicted breeding value based on the animal's own performance.
4. Index for weaning weight of the animal. This weight is corrected for management groups, age of the animal, rearing status and age of dam.
5. The same as in 3 for the last recorded weight of the animal.
6. The same as in 4 for the last recorded weight of the animal.
7. Selection index percentage. A selection index (expressed as a percentage) which combines the first and last recorded weights of the animal. Not available if only one weight was recorded.
8. Scrotum deviation. If the scrotum circumference was measured, this is the deviation from the average value of the group.
9. Grade : If the breeder classes the animals in visual groups and submits the grade with the weights, this value is then displayed on the report.
10. ID of dam of the animal.
11. Number of productive years of the dam.
12. Total number of lambs weaned by the dam.
13. The ewe productivity index (EPI) deviation of the dam.
14. ID of sire of the animal.

Appendix III

National Small Stock Improvement Scheme
Animal Improvement Institute
Challenging Present—Superb future

Owner:
Address:

Fibre Report

Date: 10/05/2000
Member No: 123456

Flock No.: 4567

FDM: 789
Reference No: 005990
Page: 1

Breed = XXXXX Sex = Rams

1 Animal ID	2 RS	3 BW ind	4 CFW ind	5 FD ind	6 SL ind	7 PS ind	8 Dev. CV	9 CF	10 Grd.	11 **Rank**	12 Sire ID	13 Dam ID	14 Prod years	15 No wean	16 **EPI dev.**
888 98 044	2	120	112	94	98	108	-2.21	99.9	64U	**1**	888 96 126	888 93 036	4.0	6	**17**
888 98 033	2	107	110	91	102	96	2.89	99.8	66P	**2**	888 96 126	888 94 090	3.0	5	**16**
888 98 268	1	118	102	94	86	84	-0.91	100.0	77H	**3**	2323 95 003	888 94 097	3.0	2	**-7**
888 98 283	1	120	119	96	115	120	6.59	99.3	67P	**4**	2323 95 003	888 93 042	4.0	6	**11**
888 98 073	1	100	95	90	93	60	3.99	99.7	67H	**5**	888 96 103	888 94 240	3.0	4	**3**
888 98 236	1	100	98	89	85	96	0.59	100.0	66P	**6**	888 96 126	888 95 020	2.0	2	**2**
888 98 077	2	99	105	89	94	96	-0.91	99.9	77H	**7**	888 96 103	888 93 187	4.0	3	**-16**
888 98 133	2	112	112	96	115	96	0.79	99.9	67H	**8**	888 96 103	888 93 085	4.0	5	**3**
888 98 036	1	116	99	95	90	96	-2.01	100.0	66U	**9**	888 96 065	888 94 238	3.0	1	**-17**
888 98 141	2	100	77	86	90	108	2.89	99.8	24U	**10**	888 96 065	888 94 433	3.0	5	**8**
888 98 279	1	115	113	98	125	96	-0.01	99.8	72U	**11**	2323 95 003	888 94 415	3.0	3	**5**
888 98 297	1	115	110	97	102	108	8.29	98.6	62U	**12**	2323 95 003	888 93 155	4.0	5	**12**
888 98 223	1	110	125	98	82	108	-0.91	99.9	47P	**13**	888 96 126	888 93 305	4.0	4	**-2**
888 98 094	2	112	127	100	137	108	-2.21	99.9	66P	**14**	888 96 049	888 92 021	5.0	7	**6**
888 98 035	1	120	103	99	103	108	-0.61	99.8	77H	**15**	888 96 103	888 92 117	5.0	4	**-4**
888 98 174	1	115	111	99	90	108	-2.21	99.9	67H	**16**	888 96 126	888 93 181	4.0	3	**-9**
888 98 111	1	116	104	99	107	96	-0.61	99.9	78H	**17**	888 96 065	888 94 363	3.0	3	**-3**
888 98 131	2	107	115	97	92	108	0.39	99.9	67H	**18**	888 96 126	888 94 266	3.0	3	**-5**
888 98 291	2	110	109	99	89	84	-0.91	99.7	66H	**19**	2323 95 003	888 93 248	4.0	6	**13**
888 98 354	2	89	98	89	90	96	4.99	99.7	64U	**20**	3223 95 003	888 93 261	4.0	5	**1**
888 98 034	2	110	120	99	98	108	-1.31	99.9	67H	**21**	888 96 126	888 94 090	3.0	5	**12**

1. Identity (ID) of animal.
2. Rearing status of animal.
3. Columns 3–7: indexes for body weight and fleece traits.
8. Dev.–CV is the coefficient of variation of fibre diameter of each animal, expressed as a deviation from the mean of the group. A negative value is considered to be better.
9. CF is the comfort factor or 100 minus prickle factor. The closer the value to 100, the better.
10. Grade: If the breeder classes the animals in visual groups and submits the grade with the weights, this value is then displayed on the report.
11. Ranking according to breeder's selection objective.
12. ID of sire of the animal.
13. ID of dam of the animal.
14. Number of productive years of the dam.
15. Total number of lambs weaned by the dam.
16. The ewe productivity index (EPI) deviation of the dam.