

Improving the Welfare and Longevity of Rams in Commercial Sheep Flocks.

Lesley Stubbings¹, Kate Philllips², Chris Lewis³ and Phil Stocker⁴

1 Introduction

There are approximately 400,000 rams in the UK and there is growing concern about their short working lives, many believed to be falling by the wayside in their first working year. However, while there is plenty of 'opinion' on this issue, there is no actual data on the extent of these losses, nor on the major causes of 'wastage' on which the industry can base any potential solutions. Rams face a considerable challenge on commercial farms, often moving from the relative luxury of a pedigree flock to the rigours of a working life, with little or no transitional period. The concern is that rams may have a relatively short flock life in the UK and this raises issues about the welfare of these animals and also represents a significant cost to the industry.

This project aimed to provide robust data on ram longevity (flock life) and the implications in terms of costs and welfare of rams if they are not meeting their expected working life. Analysing the project data should identify the most likely causes poor longevity, and hence provide clear pointers to possible solutions. Armed with this information, the next phase would seek to develop specific health and management planning for this group of animals, which could be integrated into protocols for both commercial and pedigree breeding flocks.

2 Materials and Methods

A pilot study conducted in 2015, provided information on ram longevity, confirmed farmers' concerns about ram welfare, and showed that they were motivated by the potential benefits of addressing these issues. The ram cost/lamb sold varied by 300%, which illustrated the scope for improvement across the industry. To move forward a larger evidence base was required. This involved a further ten focus groups across the UK. A more extensive web-based survey was used to bolster the information on the main issues raised in group discussions and to allow more robust analysis. A small number of producers were also recruited to keep detailed records of ram weights, age, body condition and physical fitness.

The project consisted of four main elements:

2.1 *General survey of sheep farmers (Survey Monkey)*

The full survey questionnaire and results can be found at Appendix 1. The objective was to gain a wider view on farmer expectation of ram flock life (longevity) versus reality, where and how rams are bought, cost, the health and nutritional management of rams and how they are selected.

This was conducted using an online survey (Survey Monkey) between October 2016 and June 2017. Printed copies of the survey were also available and these were used at farmer meetings, shows etc., over the same period and entered into Survey Monkey by NSA staff. Information was therefore also gathered from those who were perhaps less inclined to complete the survey online, which broadened the demographic of respondents.

2.2 *Focus groups*

Table 1 summarises the locations, dates and numbers attending focus group meetings, together with the type of information gathered from the delegates.

Table 1 – Focus group details

Focus Group Meeting	Date	No delegates (farms + extras)	End of meeting Questionnaires completed	No. detailed ram histories returned
Shrewsbury	14 Nov 2016	9	9	5
Llanrwst, N Wales	4 Jan 2017	3	3	2
Ashford, Kent	9 Jan 2017	10 + 2	12	6
Brecon	10 Feb 17	10	10	2
Barnard Castle	23Jan 2017	9 +1	9	7
Malvern	2 Feb 17	13 +1	13	10
Aberdeen	6 Feb 2017	6 +1	8	3
Kelso	7 Feb 2017	11 +1	11	5
Kendal	Feb 2017	10 +2	10	7
Okehampton	Feb 2017	9	8	5
Pilot group	June 2015	9		8
TOTAL		90 flocks + 8 pilot	93	60
Target		98	100	100

Meetings were run by one of the specialist sheep investigators, Kate Phillips, Chris Lewis or Lesley Stubbings, with the help of a note-taker where possible. The delegate inclusion criteria required that they had a commercial (not pedigree) flock with at least 200 breeding ewes and they were prepared to try to provide the detailed historical information described in section 3.

Each group member was asked to complete the Survey(Monkey) before the meeting, so the main discussion could be centred on the group replies, compared to the main survey results gathered by that point in time. Meetings lasted about two hours, following a common structure and note-taking framework. Within this some quantitative questions were also included to provide common benchmarks across the groups. A short questionnaire at the end of the meetings was completed by 93 attendees. The objective was to have ten meetings with ten farmers at each. Table 1 shows an attendance of 98 people achieved over the ten meetings representing 90 different flocks.

2.3 Detailed ram purchase/loss history

The objective of this part of the project was to gather more detailed historical information on ram purchases and losses over several years from those attending the focus group meetings. The data collection sheet was based on information gathered during the pilot phase of the project in 2015 and required the farmers to provide up to five years data on costs, losses, culling and flock performance. These data were then entered into a farm specific spreadsheet and the farm KPIs were collated in a master spreadsheet for all farms. These data were used to calculate four Key Performance Indicators (KPIs):

- **Ram life in the flock (average years)** - calculated as an average across the years using numbers brought into the flock minus losses (died and culled)
- **Ram lifetime output of lambs** - calculated using the ewe:ram ratio x ram years x lambing % of the flock. For example, 40 ewes/ram x four years ram life = 160 x 170% lambs reared = 272 lambs per ram lifetime
- **Cost of the ram* per lamb reared** - a function of the average cost of the rams for that farm divided by lifetime output. For example £500 spent on rams with an output of 272 lambs/lifetime = £1.84/lamb reared. **No cull value included*
- **Cost of the ram per kg carcass** – with more emphasis on the unit cost of production in sheep systems, this KPI was calculated using a standard 20kg carcass. For example the cost of £1.84/lamb over 20kgs = 9.2p/kg

In addition, other valuable information was obtained on ewe:ram ratios, ram loss rates etc., which are included in the results.

2.4 Farm data - ram BCS and weight

Five farmers were each asked to weigh and condition score their rams before mating, and as soon after mating as was practical, to gain some data on the weight and condition lost by these animals over the mating period. Information was gathered on 89 mature rams and 12 ram lambs (101 in total).

3 Results

3.1 General survey of sheep farmers

The full results of the survey are available in Appendix 1. There were 586 replies which includes those collected on line and those entered from paper copies completed at meetings, shows etc. The main findings from the survey provide an insight into the issues of ram selection and management.

3.1.1 Flock description (Questions 1 - 4)

Respondents submitted the first half of their postcode. It is clear that they were mostly from England (which has the largest national flock), with a low response rate from Scotland and North Wales.

Figure 1 – Geographic spread of survey respondents

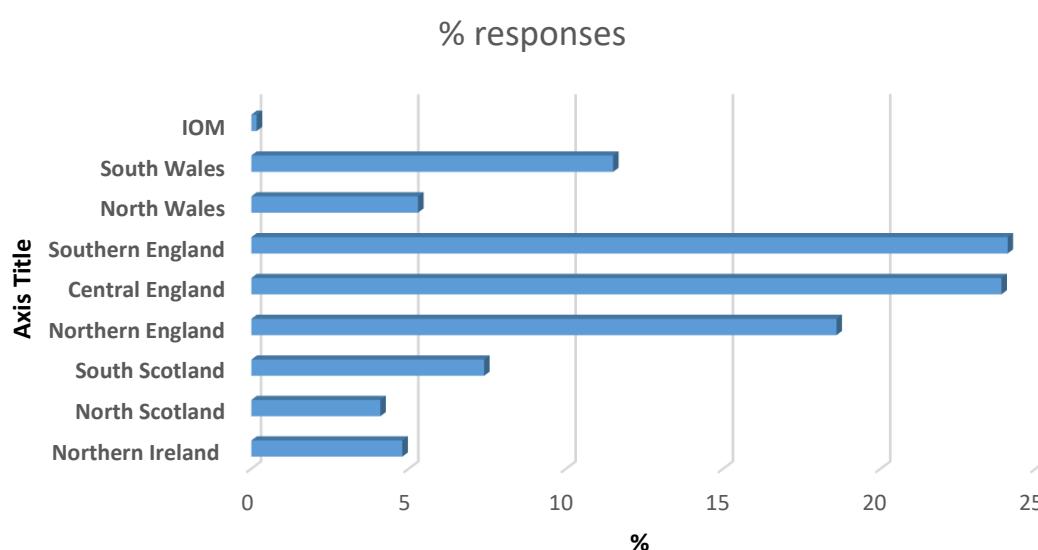
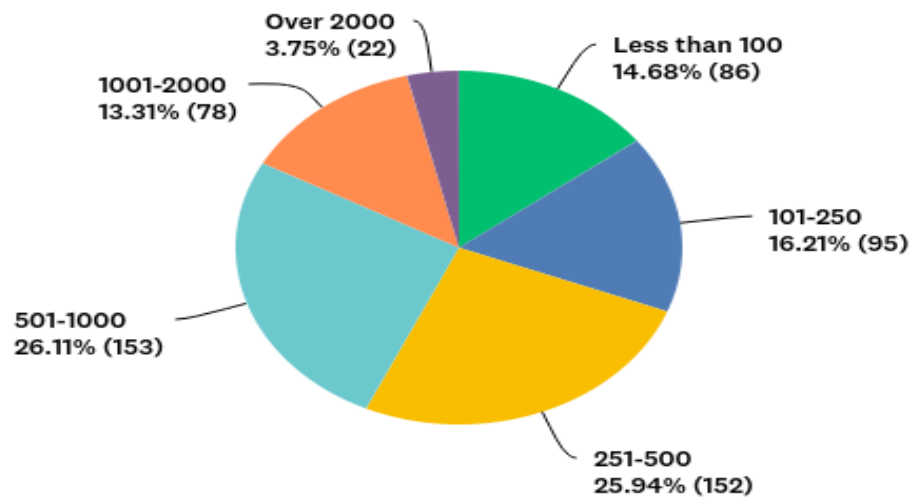


Figure 2 illustrates the flock size distribution of respondents. Most respondents fell in the range of 250 to 1000 breeding ewes (52%) which would be a good representation across the commercial sheep industry.

Figure 2 – Flock size distribution



For the purpose of looking at the influence of flock size in the analysis, the size ranges were grouped together :

- Up to 250 ewes = small (181 flocks)
- Between 251-1000 = medium (303 flocks)
- Over 1000 =large (100 flocks)

Respondents flocks were predominantly lowland (54%), followed by upland (29%). The analysis showed that there was a bias towards hill /upland flocks (53% v 41% overall) in the largest flock size category which was to be expected.

Figure 3 – Flock type

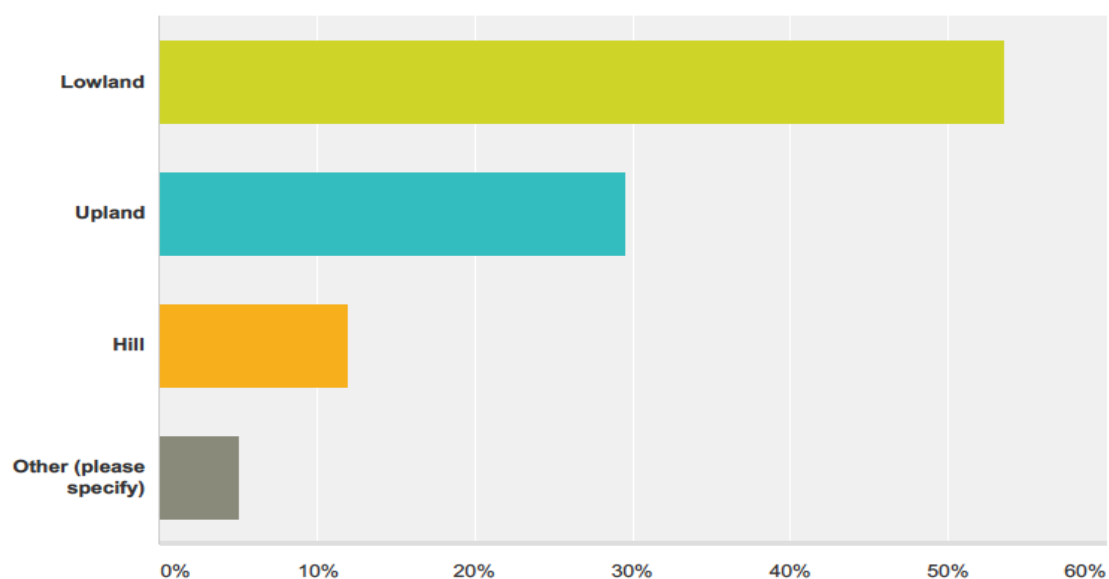
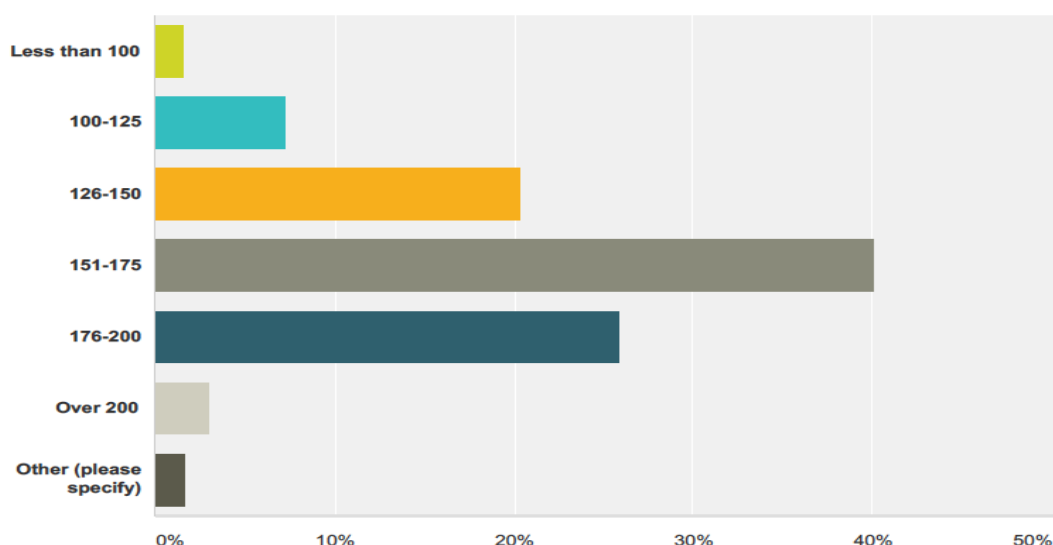


Figure 4 - Lambing %



The data on lambing %, with many scoring themselves between 151 and 200%, was surprising given the national figures published by organisations such as AHDB Stocktake etc. The LSSC data sets and authors' experience would suggest an average below 150%.

Many sheep farmers use their scanning % rather than the true rearing %, either because they do not know the latter, or they prefer not to think about the lambs they lose. The implications for this are that the lifetime output of rams in the more detailed figures could be an over estimate. However, as can be seen in the results the average lambing % of that dataset was 150%, which is much closer to the figure expected.

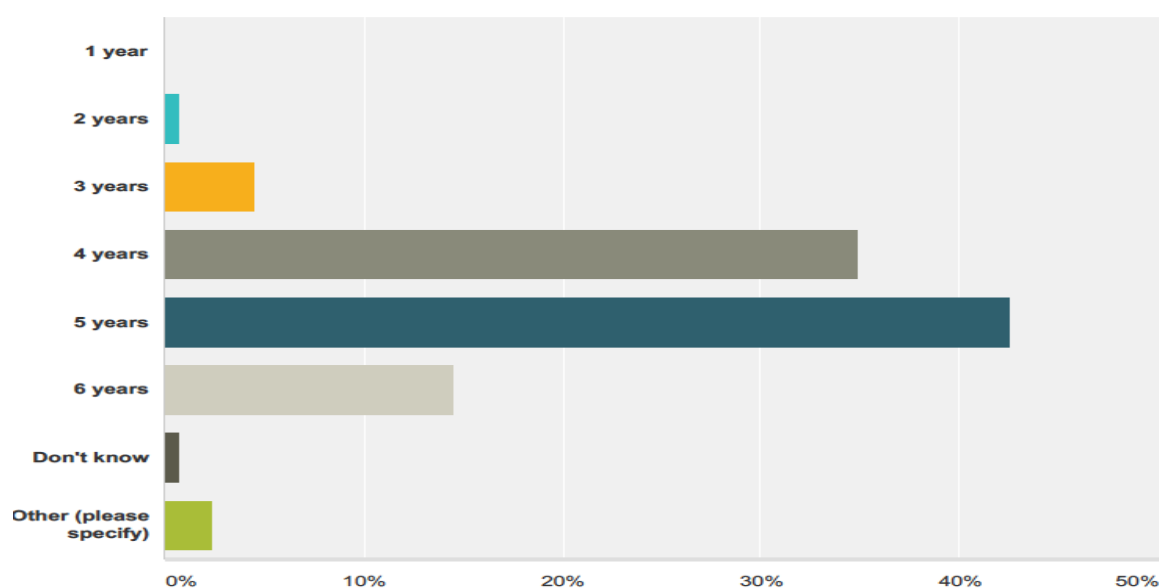
3.1.2 Longevity and ram costs (survey questions 5,7,8,9,and 10)

Most respondents bought shearling rams (70%), with 21% buying ram lambs. The other rams purchased were not of any specified age probably because they were older.

Farmers in the focus groups felt that shearlings are a risk in their first year on farm until they acclimatise to their new environment - if they survive year 1 then they are generally OK. Shearlings are a lower risk than ram lambs because they are not pushed / fed so much hard feed. Shearling survival rate higher than ram lambs.

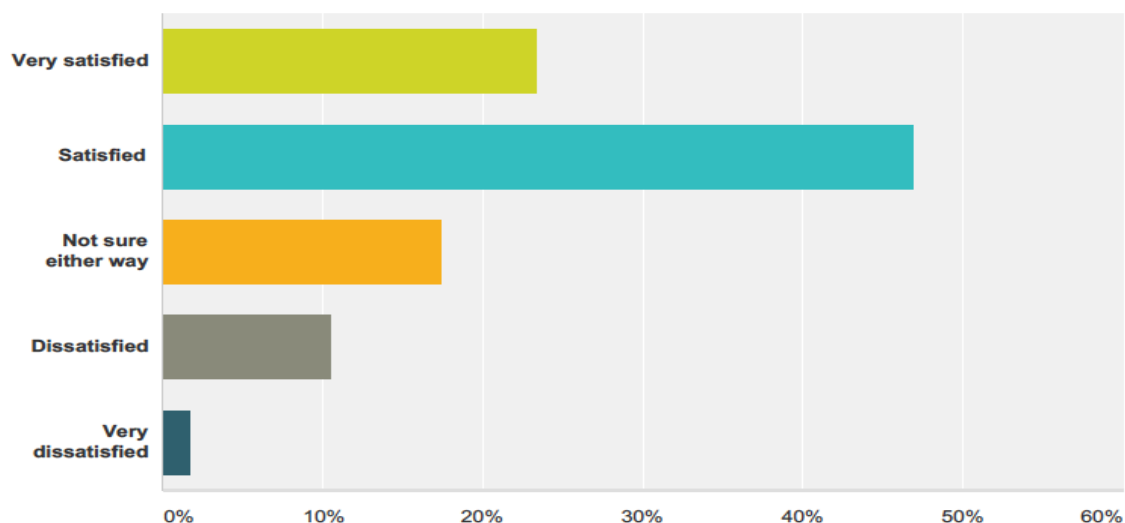
In this set of questions, the farmers were asked how long they thought rams should last, the amount they paid for rams, how satisfied they were with the life of rams and then, later in the questionnaire how long their rams actually lasted. The majority (77%) of respondents felt that rams should have a flock life of four or five years as shown in Figure 5 below.

Figure 5 How long do you think rams should last?



Moving on to the degree of satisfaction (Figure 6) 70% of respondents indicated that they were either satisfied (47%) or very satisfied (23%) with how long rams lasted, with just over 12% being either dissatisfied or very dissatisfied.

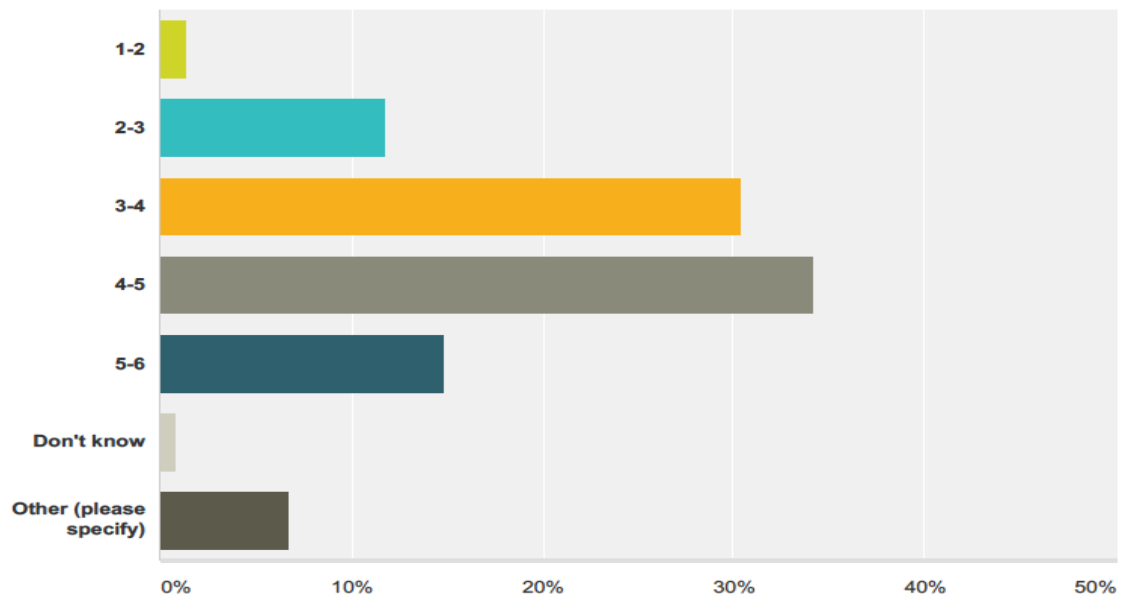
Figure 6 – How satisfied are you with the working life of your rams



From the two questions above it might be expected that when asked about the actual working life of rams, there would be little difference between that and their expectation, given the levels of satisfaction. However, this was not the case (it should be noted that these questions were deliberately separated within the questionnaire to avoid leading the answer).

When asked later in the survey about the actual life of their rams (Figure 7), it is clear that rams are not meeting the stated expectation/requirement. This suggests that perhaps farmers are more satisfied than they should be and/or accept that rams will not last as long as they would like.

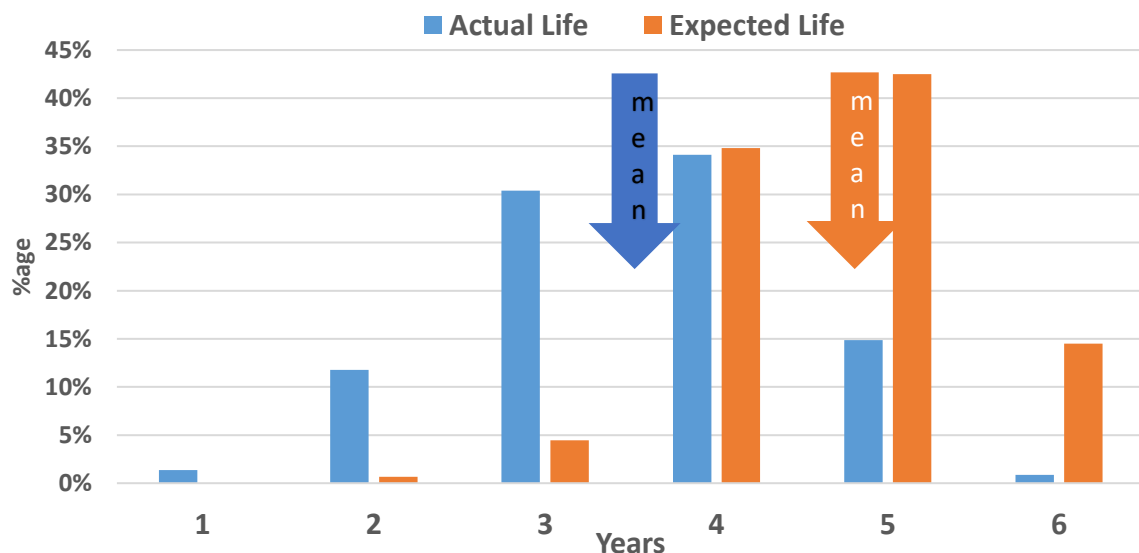
Figure 7 - What is the working life of your rams?



Not all breeds are the same. Farmers in the focus groups felt that maternal ram breeds last longer than terminal sires because they are selected on attributes that are more likely to convey longevity.

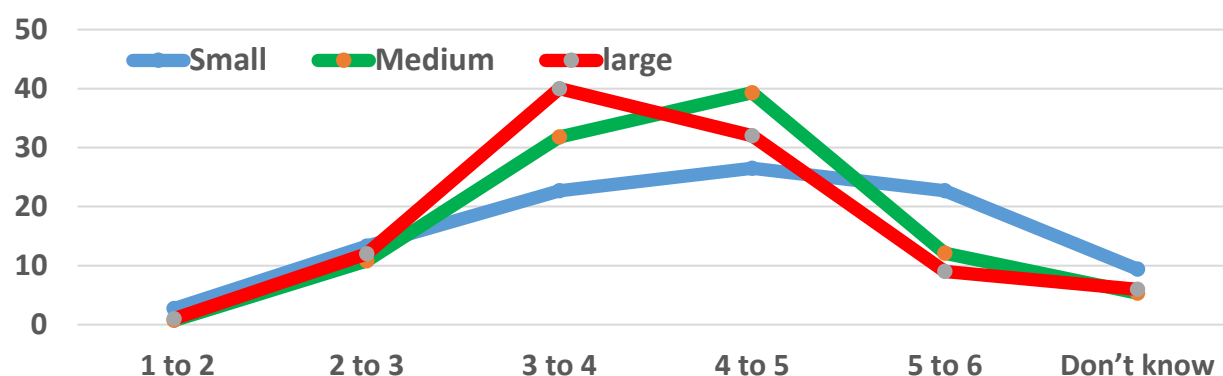
Combining the results for the two questions (expectation and reality) in Figure 8 below, the mismatch is clear, with rams lasting exactly a year less than the farmers would like them to. The mean expected working life (Figure 5) was 4.8 years compared to a mean estimate of the actual working life (Figure 7) of 3.8 years, exactly a year difference.

Figure 8 – Expectation of ram flock life compared to how long they actually last.



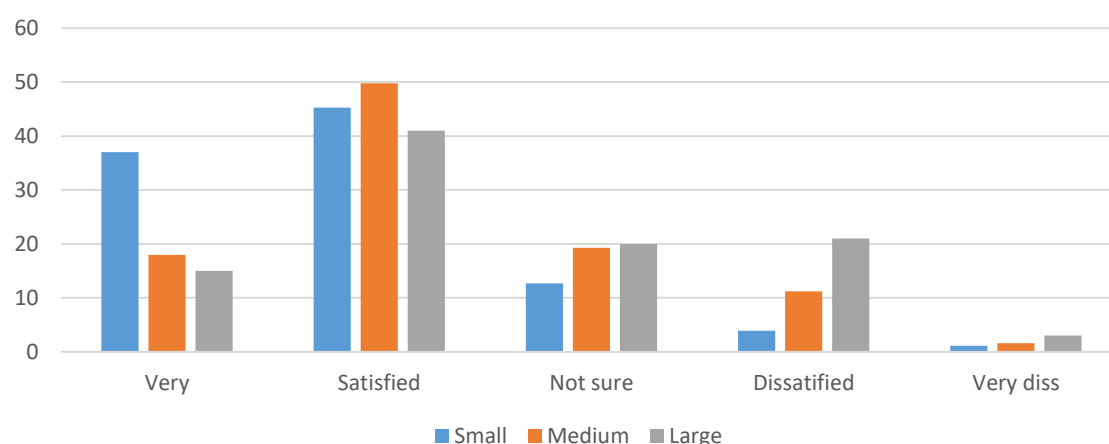
The difference in how long rams last according to flock size was then investigated. In this case it appears that rams in the larger flocks have a shorter flock life than those in medium or small flocks as illustrated in Figure 9 below. Large flocks peak at 3-4 years: medium at 4-5 years while small flocks are more diverse, spread across the range with more than 20% lasting five to six years.

Figure 9 – Working life of rams by flock size (% or replies)



This is in contrast to farmers' expectations which suggests that the majority (85%) of large flocks expect a 4 or 5 year flock life. This would explain why, when satisfaction ratings are examined (Figure 10), large flock owners are less satisfied than the others.

Figure 10 – Satisfaction with ram flock life by flock size

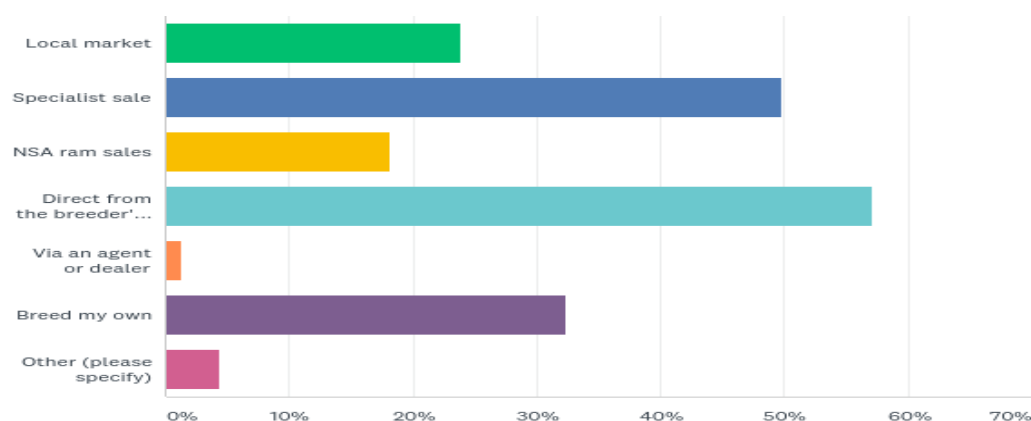


Owners of larger flocks tended to be less satisfied with 56% saying they were very satisfied or satisfied compared to 68% of medium and 82% of small flock owners and as can be seen in Figure 10, many more indicating they are dissatisfied.

3.1.3 Buying rams (survey questions 11, 12,13, 21, 23)

Respondents were then asked where they bought their rams, how they selected them, what they pay and how much they know about the ram's previous management and health treatments.

Figure 11 - Where are rams bought?

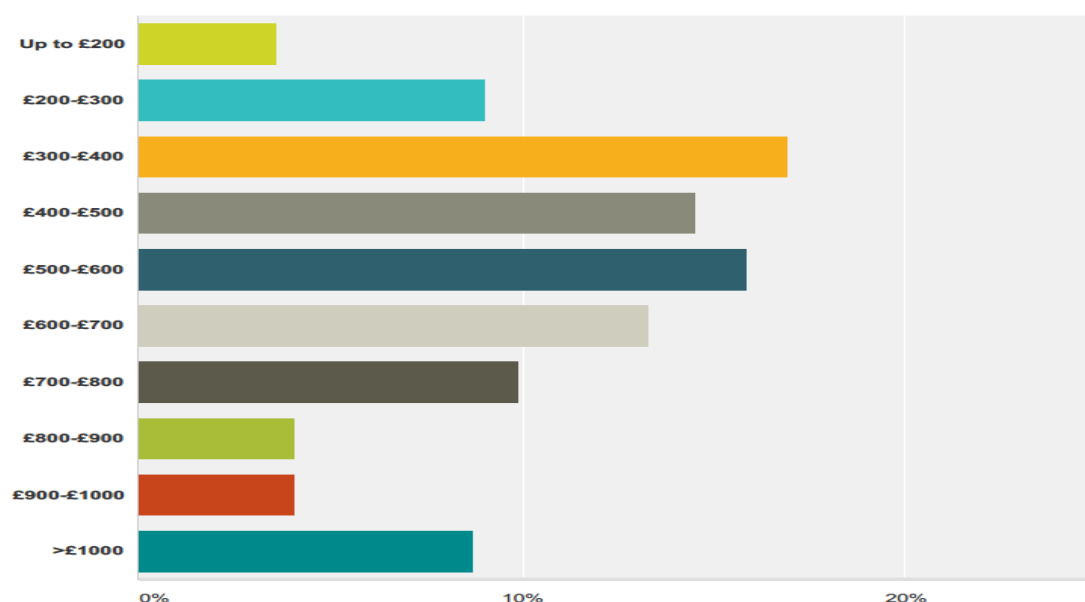


Overall, the most common way to buy rams was direct from the breeder (57%). This is higher than expected and reflects a positive trend across the industry.

There were no major differences based on flock size (Figure 13 below), although large flock owners were a little more inclined to use specialist sales. As previously stated, these large flocks were biased towards the hills/uplands (33% lowland compared to 58% lowland in the small and medium categories). These large hill flock managers would traditionally go to specialist sales to buy their rams, although it is interesting that they do also buy direct from breeders as often as those with smaller flocks.

Farmers in the focus groups felt that some breeders are still not prepared to sell rams direct from home because they need the 'shop-window' of market to promote their stock.

Figure 12 – How much do you pay for your rams?



There was a huge variation in the amount paid for rams, the majority falling in the range £300 to £700.

Farmers in the focus groups were surprised by the variation in the amount paid for rams in the survey. Ram value – several people said a ram is worth 10 fat lambs – which suggests that they are already linking it to ram output although at an average of £500 not necessarily carrying this out! They also felt that large, overfed rams are more likely to die yet the largest rams seem to make most money. Those with the best performance figures do not always make the highest prices.

Figure 13 – Effect of flock size on where rams are bought

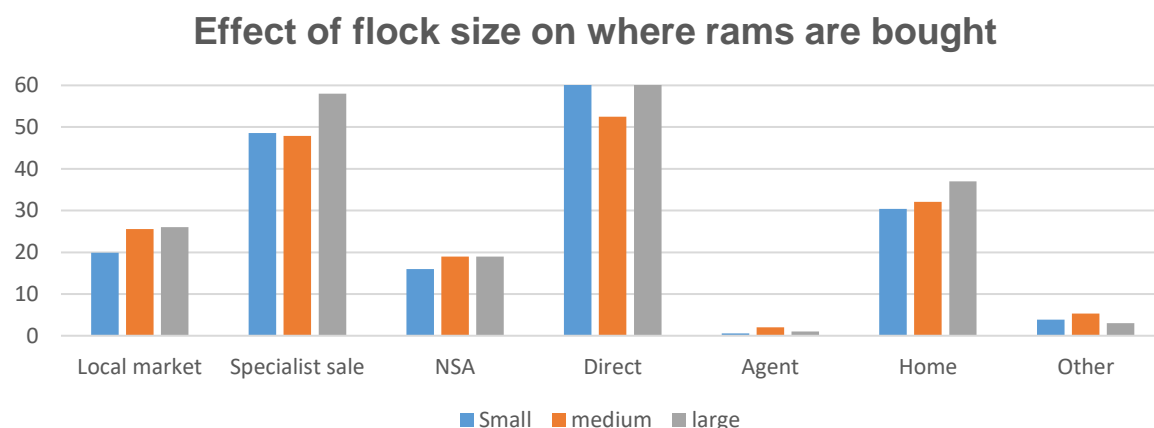
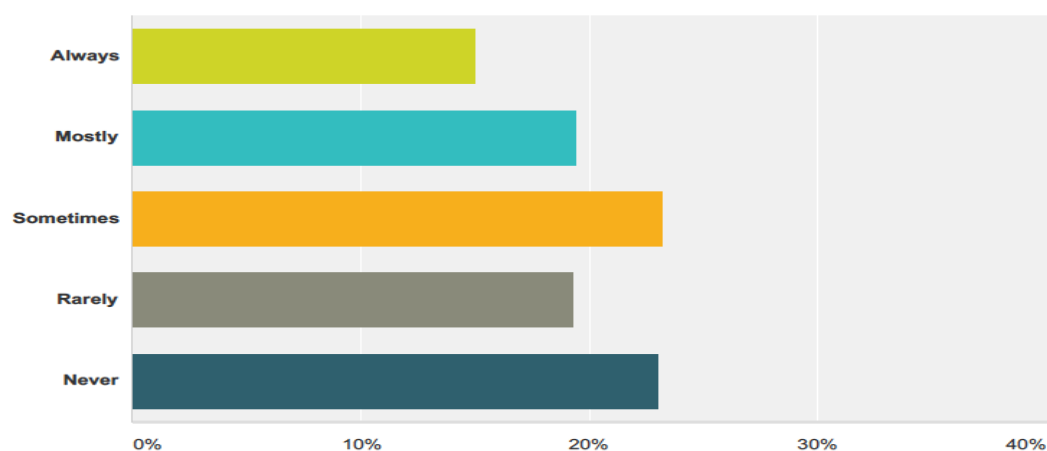
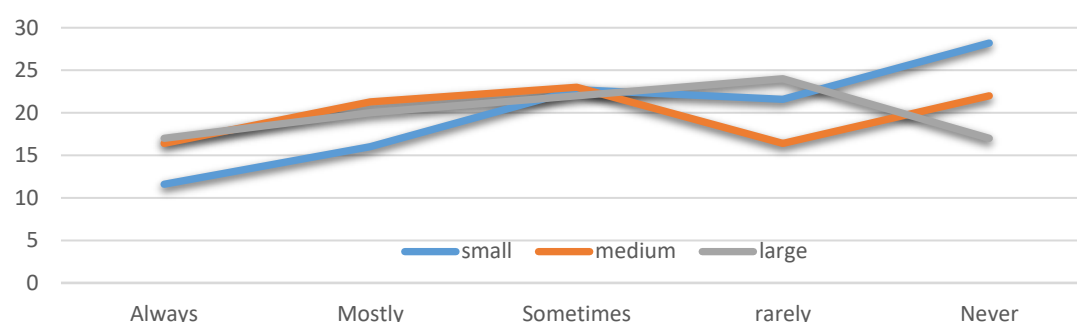


Figure 14 - Do you buy performance recorded rams?



Only 34.5% of respondents always or mostly buy performance recorded rams, with a slight increase in lowland flocks to 38.9%: but 42% rarely or never buy recorded rams. Large flock farmers are more likely to buy recorded rams (Figure 15 below).

Figure 15 – Do you buy performance recorded rams – by flock size

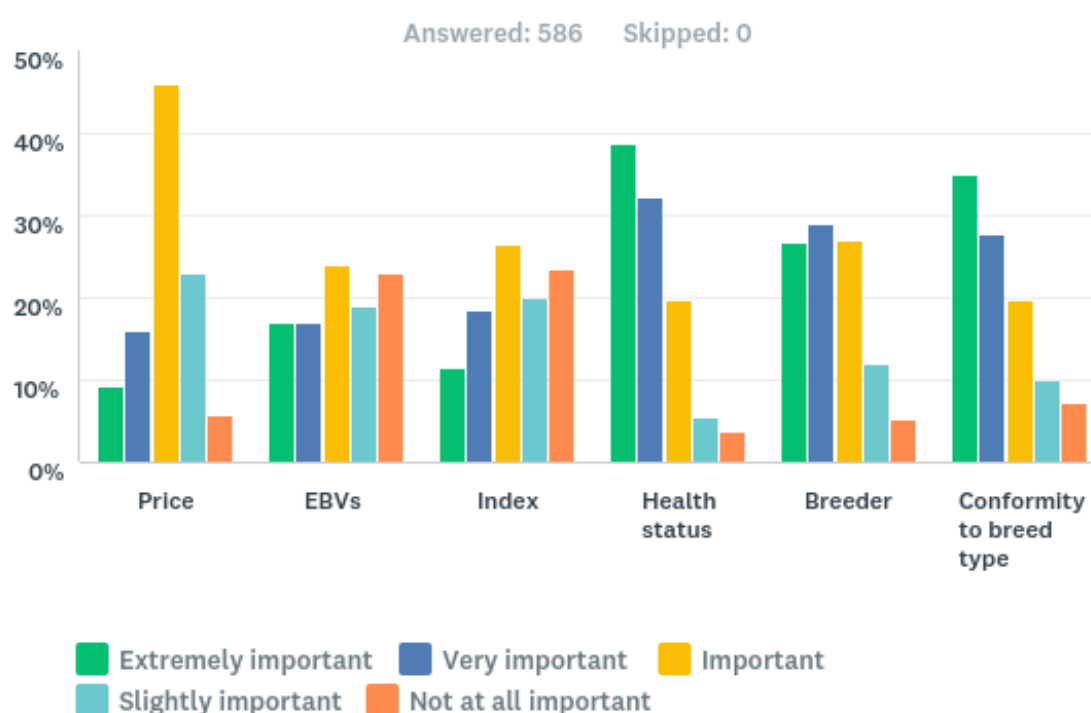


Generally, our focus groups felt that performance recording was not important and tended to be distrustful of the data.
 They perceived it was possible to falsify figures. Trust in pedigree breeders was disappointingly low and they felt some breeders were not in tune with commercial production of quality finished lambs.
 How rams were fed was of more value to them.
 They also wanted breeders to cull harder for lameness.
 Value for money judged by length of life and lamb quality.

Farmers were asked how important each of the specified factors were when choosing which ram to buy. Health status was clearly the most important with 71% saying this was extremely or very important, compared to less than 30% attaching the same priority to price.

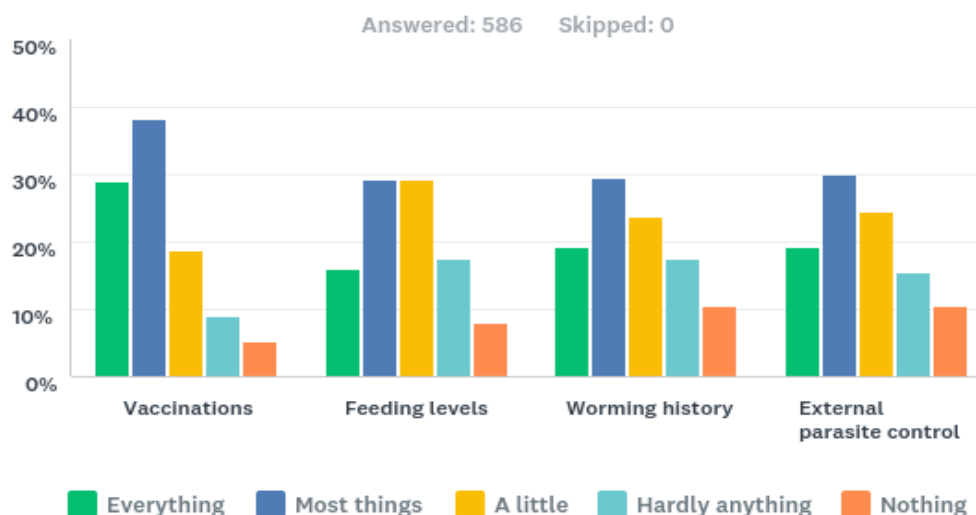
In line with the relatively low numbers of farmers buying performance recorded rams, EBVs and Index were the least important factors, while conformity to breed type was second most important.

Figure 16 - How do you select your rams ?



Respondents were asked how much they knew about the health management of the rams they bought (Figure 17). This showed that about two thirds knew everything/most things about vaccinations. However, 50% or less had the same amount of knowledge of feeding levels or worming/ectoparasite regimes. This was discussed at length in the focus groups, as there seems to be a significant mis-match between the emphasis on health status as a selection criterion and actual knowledge.

Figure 17 - How much do you know about previous management of rams?



Only 67% of respondents said they knew everything / most things about vaccination history and this %age dropped when asked about feeding, worming or external parasites. Delving into this further, as might be expected, this varied depending on the source of rams. 80% of those buying direct from the breeder knew everything/most things about vaccinations. 60% said the same for feeding, worming and ectoparasite control. Only 45% of those buying in the market knew everything/most things about vaccinations. This dropped to below 30% for the other three factors, the lowest being feeding levels at 25%.

Focus groups said that more farmers should ask ram vendors for details on feeding and health before purchasing.
There was also an element of distrust in the information they were given by vendors among some focus group members.

3.1.4 Health and losses (survey questions 13,14,15,16, 18 and 19)

Figure 18 - What routine treatments do you give to rams?

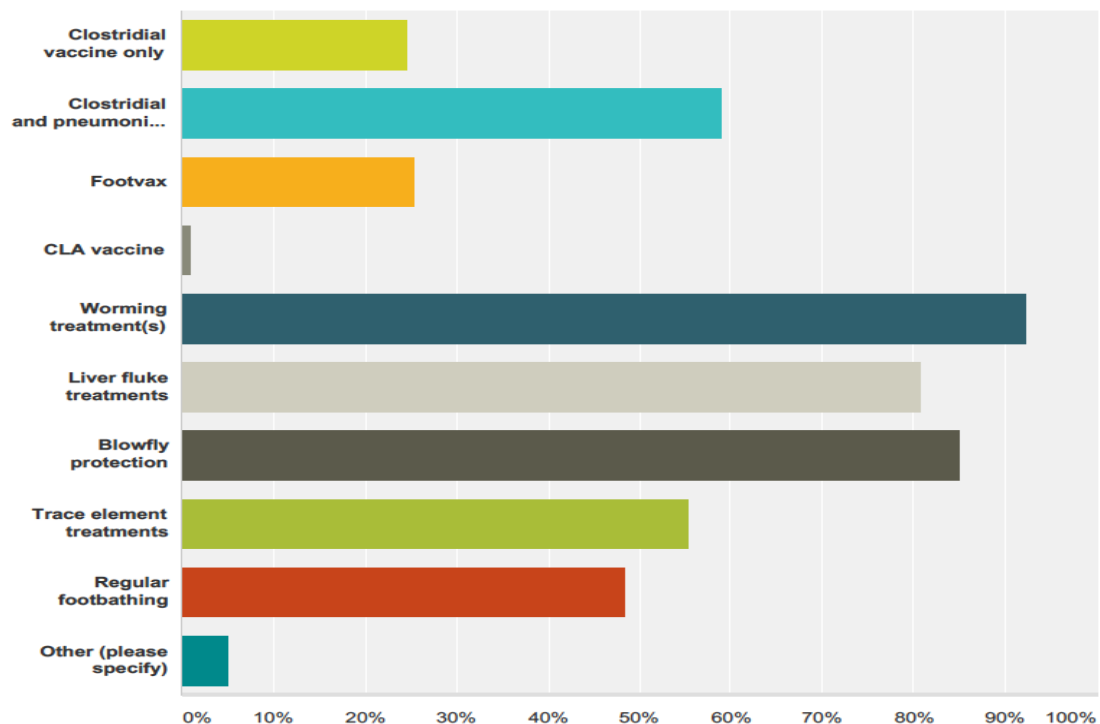
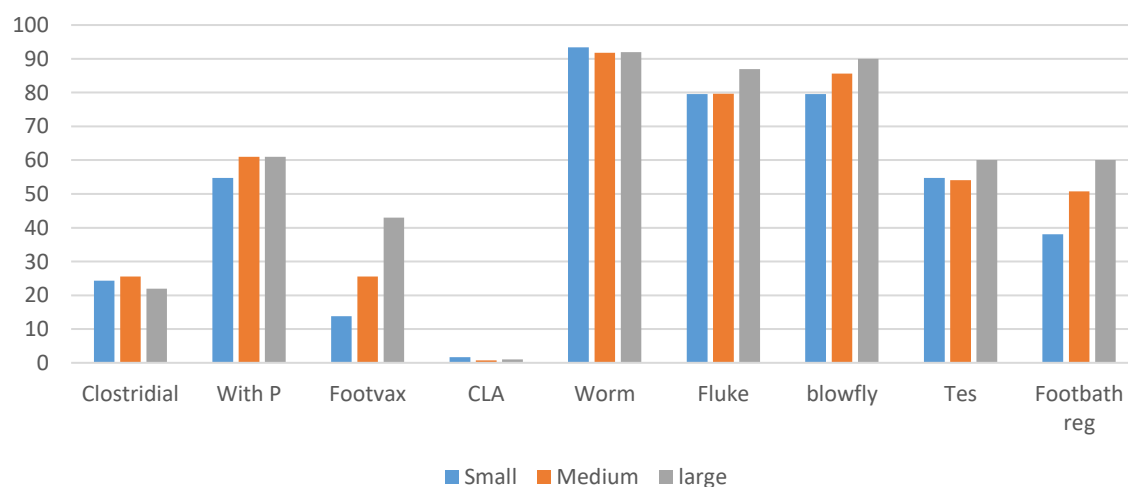


Figure 18 shows that only 59% of rams are routinely given a clostridial + pneumonia vaccination. A further 24% receive clostridial vaccination, which means 83% of rams are covered for clostridial diseases. Only 25% receive Footvax. Figure 19 highlights some differences in routine treatments given according to flock size. In particular, large flock managers are using more footrot vaccine and regular footbathing. The proportion using Footvax for example increased to 42% compared to 14% in small flocks. Large flock managers are also carrying out more regular footbathing (60%) compared to small flocks (38%).

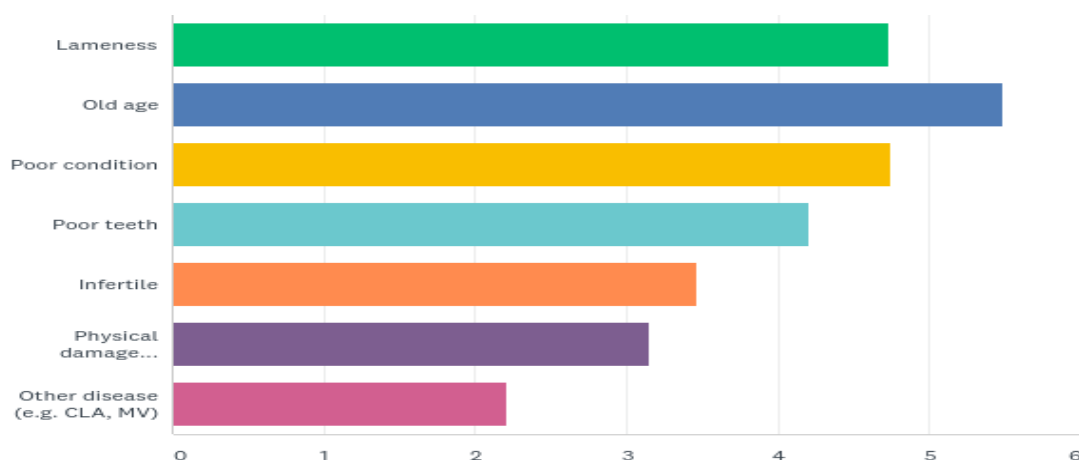
Figure 19 – Routine treatments by flock size



Rams are not always included in the flock health plan. One reason given was that rams are often not on farm or in the right place when ewes/ewe lambs are vaccinated / treated and the short shelf life of vaccines restricts use. A lot of farmers are not using clostridial vaccines but many use trace element supplements. Some wormed shearlings and older rams only once a year – mostly pre-tupping, but treated ram lambs the same as all other lambs. One group very strongly stated that they rely on the vendor to provide healthy animals as they trust them. In contrast, many said they do not trust vendors (buying from market etc) and start again with health treatments and vaccines when get rams home (scab, AR etc). Many focus group members were using Footvax to good effect. Some are trying to buy rams earlier (July) direct from the breeder to get a better selection of rams and to allow for vaccination and quarantine. Generally our focus groups were looking to buy more rams direct from breeders farms in the future.

Figure 20 - Reasons why rams are culled

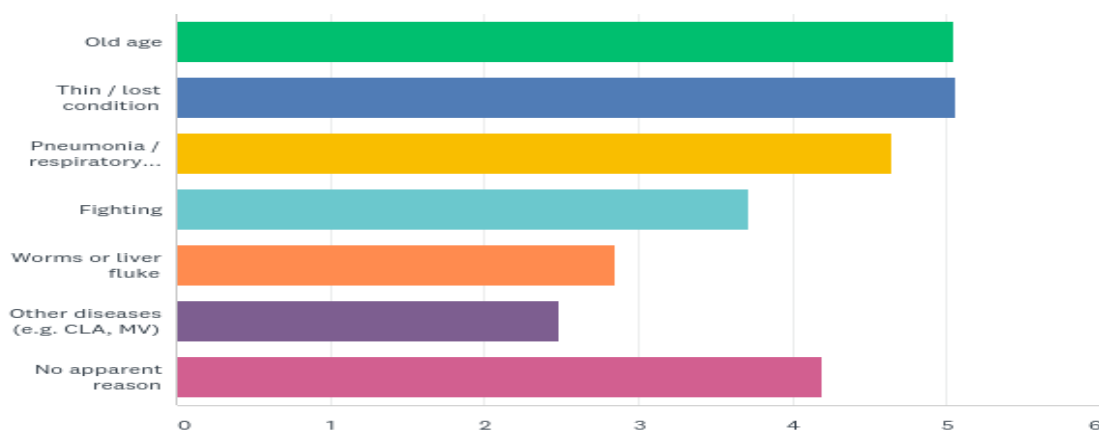
After old age, lameness and poor condition are the most common reasons for culling.



In the focus groups only a small proportion of farmers consistently carried out ram MOTs. Many were not happy to get rams fertility tested and perceive it to be a welfare problem as well as the cost which they felt is prohibitive at £50 to £60 per ram. Some focus group member were culling early to increase the egentic turnover in their flocks.

Figure 21 - Reasons why rams die

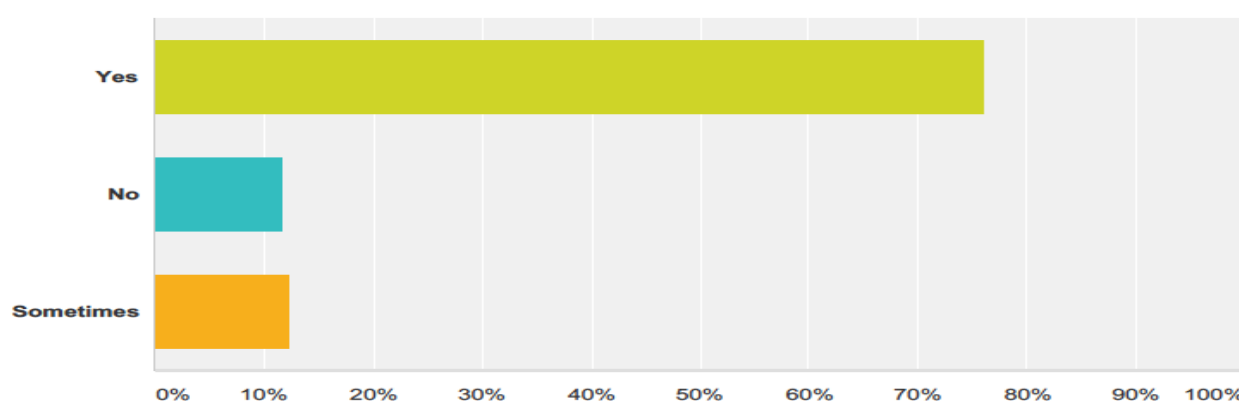
After old age and loss of condition, respiratory disease is the most common cause of death, followed by 'no apparent reason'.



The implications of the answers above are discussed in the next section of the report. However, it is clear that a large proportion of rams are both culled and die as a result of poor condition and there are also many unattributed deaths.

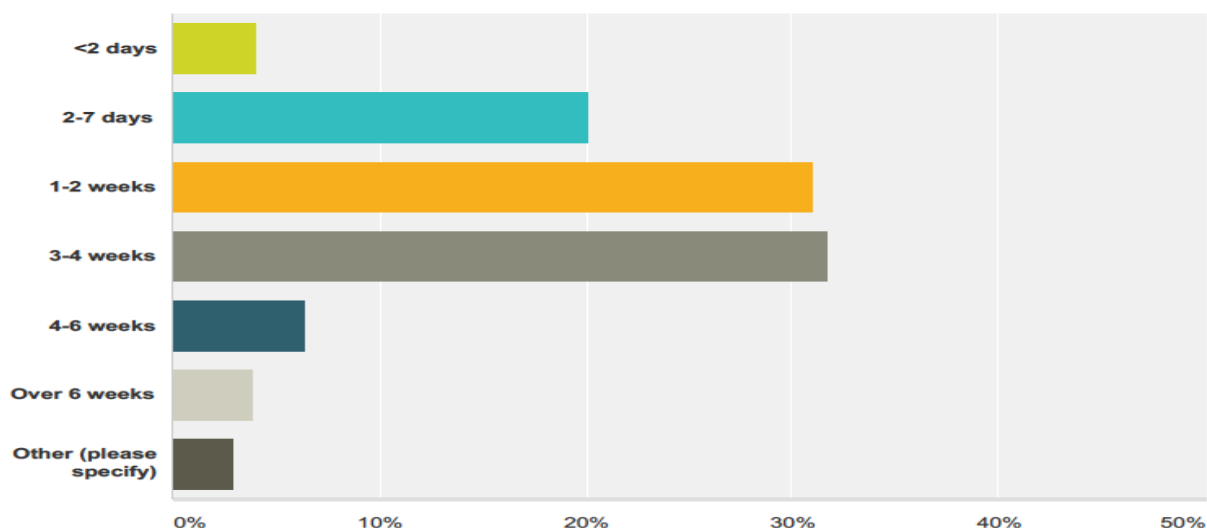
In the focus groups many said they didn't cull rams, but used/kept them until they die. This supports the finding above that old age is a major cause of death with participants agreeing that farmers are too accepting of rams dying. Some did cull on teeth which supports the Survey Monkey replies. Rams need to be kept well so that they have a decent cull value in the end. Losses ranged from 5 to 25% of rams each year and they were much worse in a wet year. Focus groups mentioned that housing over winter was needed when weather is poor/wet. One group said the proportion of rams they cull now exceeds deaths and felt that more clostridial + pneumonia vaccination was key. Others were accepting of deaths and deemed post mortems too expensive.

Figure 22 - Do you quarantine rams on arrival?



Encouragingly, 76% of respondents said they did quarantine rams on arrival, only 12% saying they did not (Figure 22).

Figure 23 - How long are rams in isolation?



However, when asking those who did quarantine how long they quarantined for, (i.e. left rams in isolation), the picture is somewhat less encouraging.

It is clear from Figure 23, that the period of isolation for the majority of rams is less than four weeks. 55% of farmers isolate for two weeks or less, with a further 32% allowing three to four weeks, which

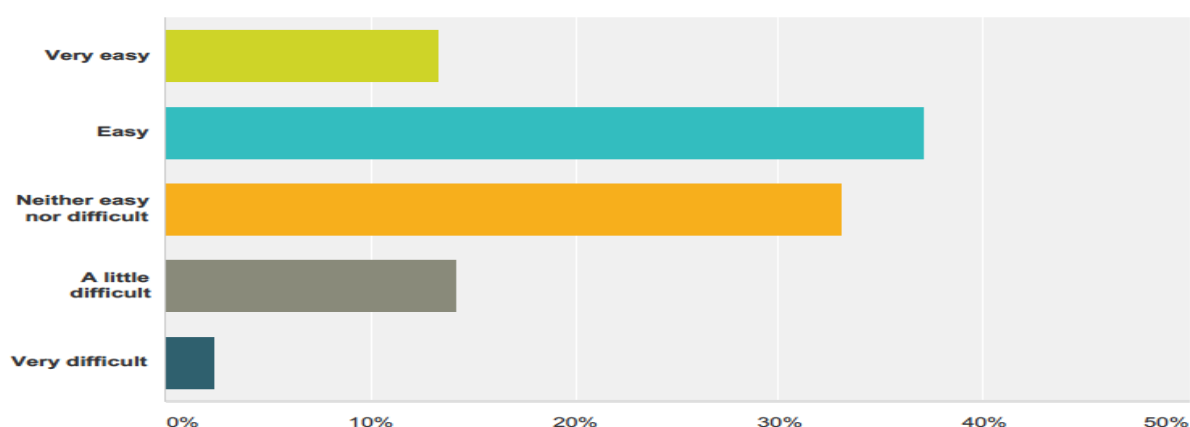
would be considered the bare minimum. Only 13% of farmers keep them in isolation for four weeks or more. Large flock managers did tend to quarantine for longer with 59% isolating for three weeks or more, compared to 45.7% of medium flocks and just 34.8% for small flocks.

Focus groups agreed that quarantine is not always carried out and varied from just a few days to over 6 weeks. Many said they trusted their ram breeder to have presented rams free from disease, with the highest level of trust when buying direct. They assume rams are 'treated' and protected from key diseases. Some breeders would treat with 4-AD wormer before delivery. Sales are too late to allow for comprehensive health treatments and sufficient quarantine.

Maedi Visna (MV) was not considered important by our attendees. MV accredited rams were bought incidentally rather than deliberately. This partially reflects the findings of the Survey Monkey where over 50% sometimes or never bought MV accredited rams and underlines the fact that MV is not perceived to be a problem by most commercial farmers. Generally iceberg diseases still perceived as a low risk. One exception was OPA which was said to be a growing (significant) problem in some areas and in certain breeds..

3.1.5 Feeding and condition (Q 17 and 20)

Figure 24 - How easy do you find it is to keep condition on rams?



In contrast to expectations, most respondents (50%) said that they found it either easy or very easy to keep body condition on their rams. Only 16% said it was difficult/ very difficult. If this information is combined with Figure 25, then this may well be linked to the fact that 69% used body condition to guide the need for supplementary feed.

Figure 25 – Supplementary feeding for rams



Focus groups generally used BCS to judge the need for concentrates, though rams were often neglected in small paddock out of the way.

Breeders should not produce rams that are dependent on concentrates. Most farmers do not want to feed rams but will do if in poor condition.

Maintaining BCS more of a problem with older rams. Some felt that rams are left in with ewes too long – they should be removed after 2 cycles.

Very few of those attending were aware of the energy and protein requirements of rams.

Replies were filtered between those who said they were satisfied with ram longevity and those who were not. This provided some very useful information and helps to validate the overall results and guide the discussion and recommendations.

3.1.6 Satisfied v dissatisfied respondents

The results were filtered according to satisfaction or dissatisfaction with ram longevity recorded by respondents (see Figure 6).

In Table 2 below, the replies for these two groups are compared, highlighting those areas where there are important differences.

Table 2 – Satisfied v dissatisfied respondents (ram flock life)

Factor	Satisfied/ very satisfied respondents	Dissatisfied/ Very dissatisfied respondents	What this means
The % of respondents who paid >£500 /ram purchased	56%	75%	A higher proportion of dissatisfied farmers paid more than £500 for their rams.
% who said their ram flock life was s 3 years or less.	8%	39%	Dissatisfaction seems to be based on a shorter ram flock life with a much higher proportion in the 3 years or less bracket.
% of respondents who bought direct from a breeder	61%	49%	A higher % of those who are satisfied buy direct from a breeder.
% who always/ mostly buy performance recorded rams	35%	39%	No difference between satisfied or dissatisfied respondents.
% who felt BCS was difficult to keep on rams	7%	53%	Dissatisfied much more likely to find it difficult to maintain ram condition.
The weighting of poor BCS as a reason for culling / ram death	Weighting 4.6/4.86	Weighting 5.29/5.68	Those farmers who were dissatisfied gave a much heigher weighting to BCS being a reason to cull and for ram deaths.
% supplementary feeding according to BCS always/mostly	67%	77%	A slight increase in the dissatisfied group towards feeding according to condition.
Weighting of old age as a reason for culling	Weighting 5.87	Weighting 4.13	Satisfied farmers are much more likely to cull on old age.
Weighting of lameness as a reason for culling	Weighting 4.54	Weighting 5.18	In contrast to the above, satisfied farmers are less likely to cull on lameness in rams.

3.2 Focus groups

The outputs from the Focus Group discussions have been used throughout the report to support the results and observations. However, each attendee was asked to complete a short questionnaire at the end of every meeting and the results of these are summarised below (93 respondents). The questionnaire is at Appendix 2

- 88% said they felt there was either huge or some scope to increase the life of rams on commercial farms
- 78% agreed that health planning for rams was an area for improvement. 19% thought it was possibly a factor and only 2% did not agree that health planning was a weakness.
- 58% thought that more knowledge of a ram's previous management would help them a lot. 38% thought it would help a little.
- 77% said they would quarantine for longer if they could (others mainly already isolating for more than three weeks)
- 80% said that they did not know enough about ram nutrition
- Only 2% (two people) thought that there was no scope to reduce the cost of rams in commercial flocks. The majority saying they thought there was significant scope to reduce costs.

3.3 Detailed ram purchase/loss history and KPIs

The aim was to have up to 100 sets of data, but this proved to be extremely challenging. In the final analysis we have 51 sufficiently detailed returns to include in the dataset, plus eight from the initial pilot, making a total of 59

The full spreadsheet of results for all farms is at Appendix 3 Average results across the whole dataset are shown in Table 3 below with the 4 main KPIs highlighted at the foot of the table.

Table 3 – Summary of 59 detailed returns from focus groups

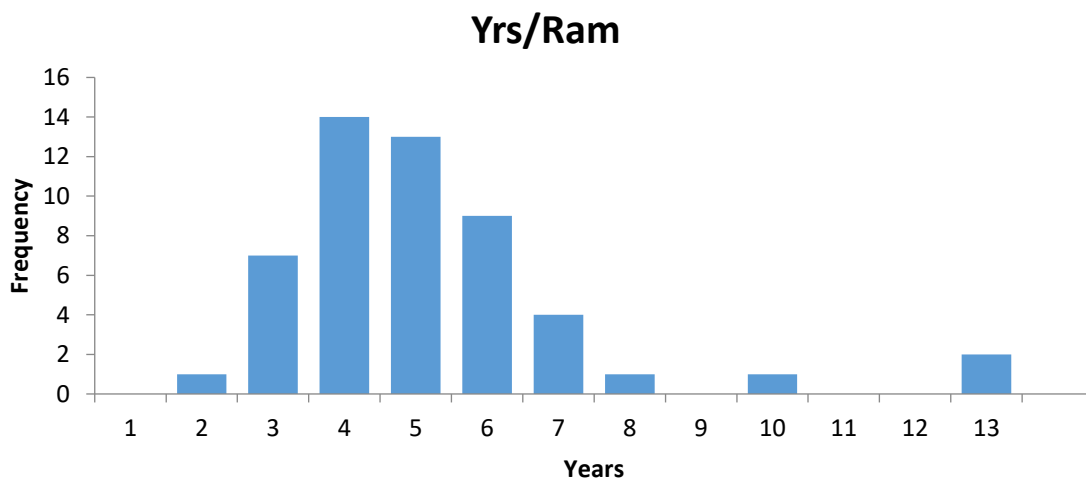
	Average of all farms
Working rams on farm at tupping	16.3
Number that were shearlings	4.5 (28%)
Average cost £/head	£528
Total ewes tupped	672
Rearing % (Lambs reared/100 ewes tupped)	149.9
Ewe/ram ratio	44
Lambs/ram year (Ratio x lambing %)	67
Loss rate of rams - %	18
Years/ram average	4.5
Lifetime output – lambs / ram	289
Cost/lamb produced	£1.99
Cost p/kg carcase based on 20 kg	10

Using the full dataset the following figures illustrate the frequency for the four main KPIs. Inevitably there were a small number of flocks with results that fell well outside the 'norm' (for example if they were a new flock with little turnover of rams in the first 3-4 years) and these are clear from these figures.

3.3.1 Ram life in the flock (Figure 26)

This figure is calculated as an average across the years of data provided using numbers brought into the flock minus the loss (died and culled) rate. The average (table 3 above) was 4.5 years and it is clear that the majority fell into the range of three to six years, with a mode of four years. This corresponds well with the findings of the Survey Monkey in the previous section.

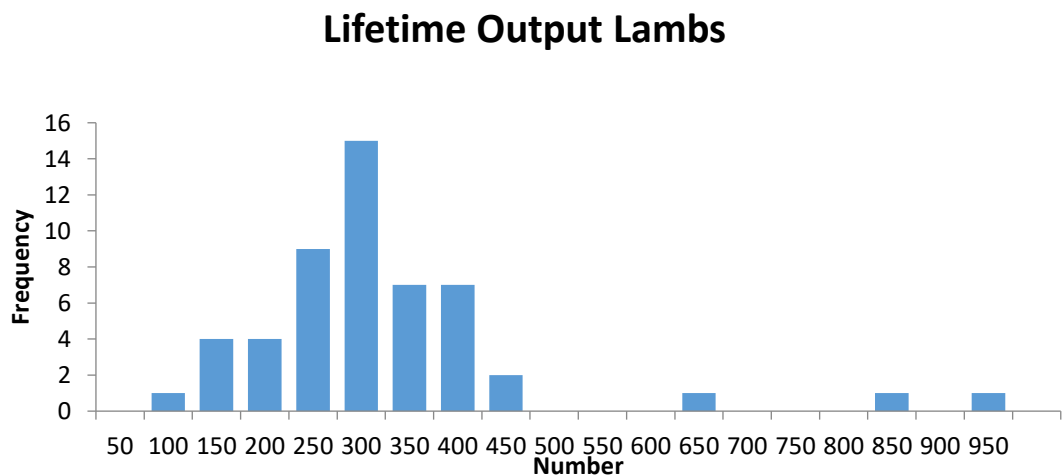
Figure 26 Ram life in the flock



3.3.2 Ram lifetime output of lambs (Figure 28)

This figure is calculated using the ewe:ram ratio x ram years x lambing% of the flock. So for example, 40 ewes/ram x four years ram life = 160 x 170% lambs reared = 272 lambs per ram lifetime.

Figure 27 - Ram lifetime output of lambs

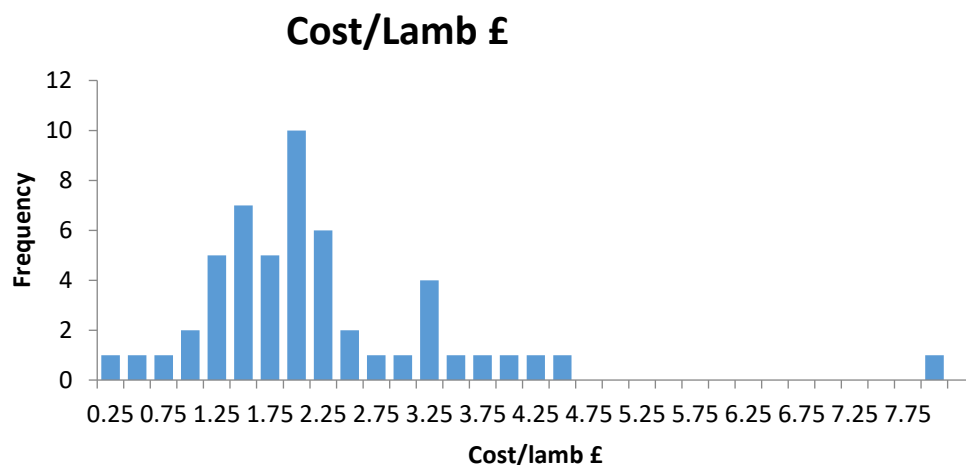


The average in Table 3 is 289 lambs per ram lifetime but it can be seen from Figure 27 that there is large variation across the dataset with a mode of about 300 with the majority of rams producing between 250 and 350 lambs in a lifetime.

3.3.3 Cost of the ram per lamb reared (Figure 28)

This calculation is a function of the average cost paid for the rams on that farm, divided by lifetime output. For example £500 spent on rams with an output of 272 lambs/lifetime = £1.84/lamb reared. Again there is a wide variation across the cohort around the average of £1.99/lamb. the majority falling in the £1.25 - £2.25 bracket while others are below £1 at one end of the scale and over £3 at the other.

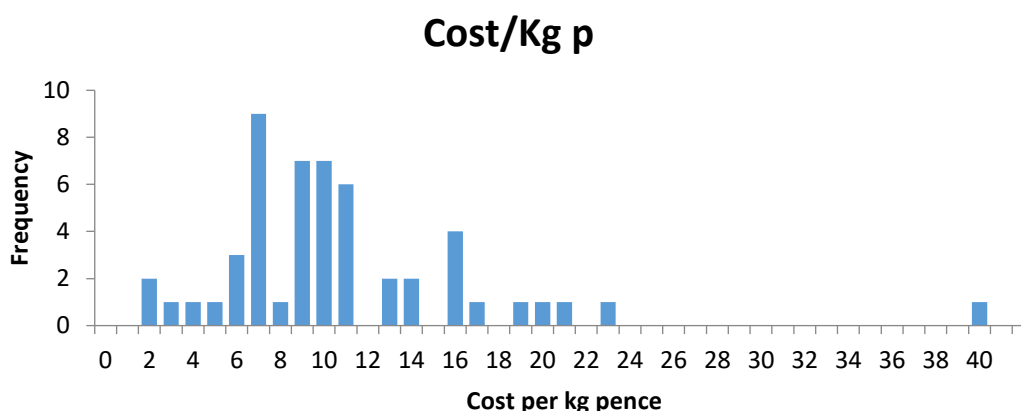
Figure 28 - Cost of the ram per lamb reared



3.3.4 Cost of the ram per kg carcass (Figure 29)

With more emphasis on the unit cost of production in sheep systems, this KPI was calculated using a standard 20kg carcass. For example the cost of £1.84/lamb above / 20kgs = 9.2p/kg.

Figure 29 - Cost of the ram per kg carcass



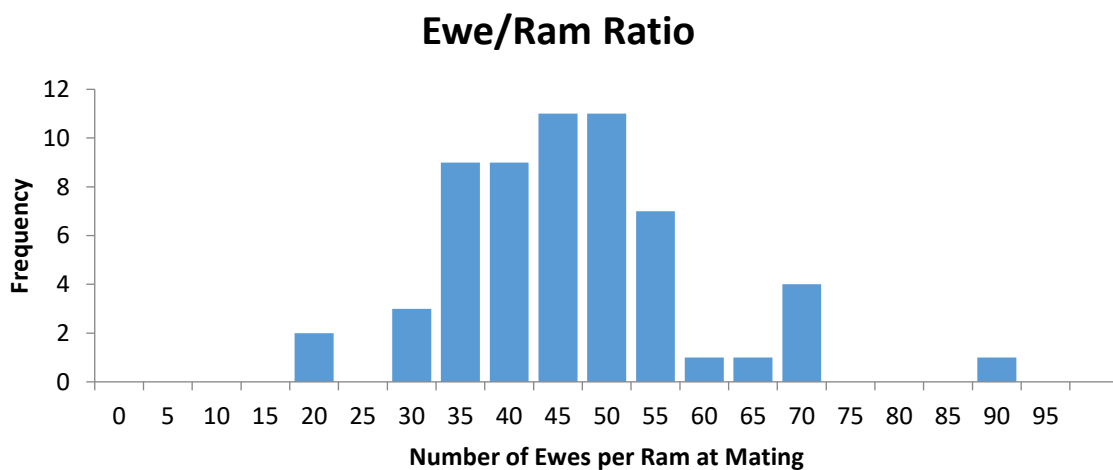
The average (Table 3) was calculated at 10p/kg carcass but again there is a wide spread in costs across the with two distinct peaks at 9-11p/kg and at 7p/kg, rather than a normal distribution curve,

In addition to the 4 KPIs there are also some other valuable data within the spreadsheet for this group:

3.3.5 Ewe:ram ratio (Figure 30)

The national standard normally quoted is 40 ewes per ram and our dataset supports this with an average of 44 ewes/ram. However, it is clear that there is significant variation, most falling into the range of 35 to 55 ewes per ram with a small proportion at 60 ewes per ram or more.

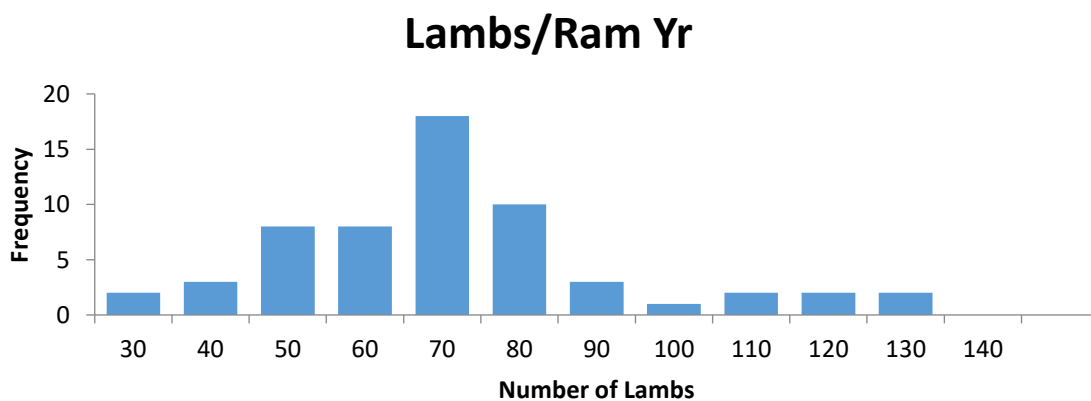
Figure 30 - Ewe:ram ratio



3.3.6 Lambs/ram year (Figure 31)

This figure is used in the lifetime output calculation, but is interesting because as a function of ewe:ram ratio and lambing %, it demonstrates the wide variation across farms. The mode is 70 which may be a useful initial benchmark in communication of results to sheep farmers.

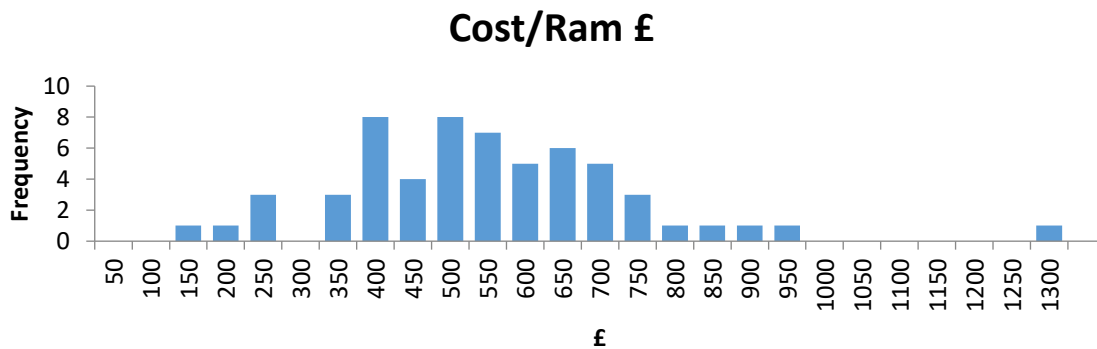
Figure 31 - Lambs/ram year



Cost/ram (£) (Figure 32)

The detailed dataset agrees well with the Survey Monkey in terms of the amount of variation in what farmers pay for rams. The majority are in the range £400-£700.

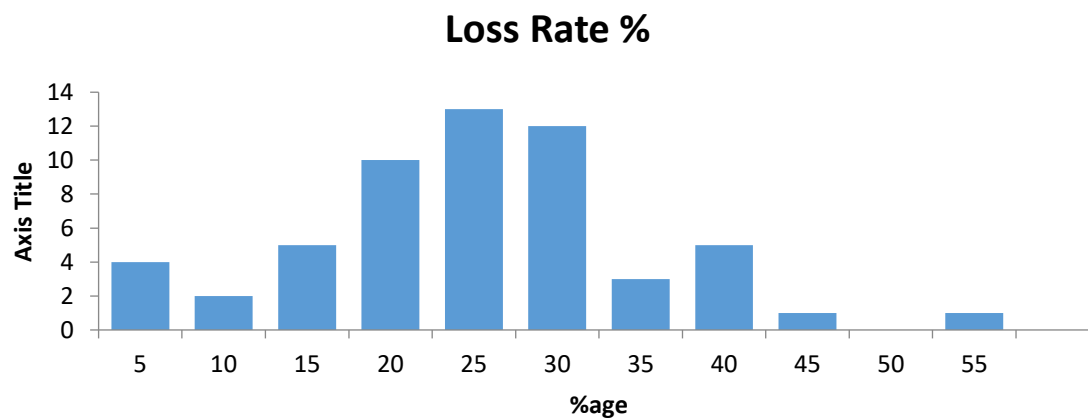
Figure 32 – Cost/ram (£)



3.3.7 Loss rate of rams (culled and died) – (Graph 33)

Industry standards would suggest that the turnover of rams is 33% (life of three years in the flock). Our data suggest a lower culling/loss rate at 20 to 30% which is in line with the higher ram flock life of 4.5 years compared to the industry standard which suggests 3 years.

Graph 33- Loss rate of rams (culled and died)



3.4 Farm Data - Ram BCS and weight changes

Table 4 below shows the average results for the farms and the individual data can be found in Appendix 4 (There are 6 data sets in total because with 2 years information for one of the farms).

Table 4 – Averages for all rams (89 in total)

All rams over 1 year of age	
Liveweight pre-tupping	83.8
Liveweight post tupping	76.3
Average weight loss pre- to post tupping (kg)	7.5
BCS pre-tupping	3.53
BCS post-tupping	3.01
Average BCS loss pre-to post tupping	0.53

Over all the rams monitored from just before tupping 2016 to post-tupping 2017, (89 in total) body weight fell by 7.5 kg with a corresponding loss in BCS of 0.53 units which is equivalent to about 9% of their pre-tupping body weight. Body weight change ranged from -23 kg (21% of pre-tupping body weight) to a gain of 4 kg. Likewise body condition score change varied from no change (0) to a loss of 1.5 units.

One of the farms also ran 12 ram lambs with their ewes. The data for these is shown in Table 5 below. Overall they lost a lot less weight and BCS than the mature rams. The ewe to ram ratio was between 30 to 40 ewes/ram lamb. Body weight change varied from a gain of +3kg to -7kg with a corresponding change in BCS of 0 to -1.

Table 5 – Average for ram lambs

Ram lambs (terminal sire) (12, average age <1 year)		
Liveweight pre-tupping	52.2	44 – 60
Liveweight post tupping	49.8	42 – 55
Average weight loss pre- to post tupping (kg)	2.4	+3 to -7
BCS pre-tupping*	4.0	3.5 – 4
BCS post-tupping*	3.8	3 – 4
Average BCS loss pre-to post tupping	0.25	0 - 1

* BCS in immature animals has to be viewed with care .

4 Summary of Findings

4.1 *Industry information*

Very little data from commercial sheep farms was available prior to this project. Most was in the form of 'industry standards'— for example John Nix (Farm Management Pocketbook) quotes 3.5 years ram life: SAC quote a 3 year flock life and ABC 3 years. The Survey Monkey results suggest that the figure is 3.8 years while our focus group members recorded 4.5 years. Both data sets suggest the actual figure is longer than the 'standards'.

The ewe:ram ratios recorded by our focus groups were still relatively low, with an average of 44 ewes per ram. This is despite a significant amount of recent KnowledgeTransfer work which has encouraged much higher ratios, often based on the use of newer composite breeding and breeds like the NZ Romney.

4.2 *Farmer satisfaction*

Generally farmers in the survey were satisfied with ram longevity, but their expectations were not matched by reality with a whole years difference between what they expected and what they later said they actually achieved (3.8 years v 4.8 years). This suggests that there is scope to improve the situation on commercial farms in line with expectations and that farmers could be encouraged to adopt management practices to achieve this.

4.3 *Purchase cost of rams*

On average respondents paid £516 /ram (mode £500). This confirms that rams are a significant cost to commercial producers and it is therefore understandable (and arguably reasonable) that the expectation of flock life is 4 years or more. However, the results suggest that the investment in rams is not being as well protected as it could be, and rams are being kept until they die or are culled due to 'old age' and poor condition.

4.4 *Reasons for dissatisfaction*

Those farmers that were dissatisfied did not have higher expectations of longevity than those that were satisfied. Their dissatisfaction was linked to low flock life coupled with the fact that they tended to pay more and struggled to keep body condition on rams. They were also more likely to buy their rams out of markets/sales rather than direct from the breeder.

4.5 *Performance recorded rams*

There was no difference in ram longevity between those who bought performance recorded rams and those who did not. This helps to dispel some of the criticism that has circulated in the industry that these high genetic merit animals do not last as long. However, the fact that body condition is clearly a factor for the dissatisfied farmers and the comments about 'over fed' rams in the focus groups would point to feeding management as being a factor to explore.

4.6 *Source of rams*

A higher proportion of farmers are buying direct from the breeders farm than expected and this trend was confirmed in the focus groups. This means that there is more scope to develop information sharing between vendor and buyer.

4.7 *Health status and nutrition*

Health status is identified as the highest selection priority when rams are purchased with 71% of respondents giving this an extremely or very important ranking. However, MV accreditation for example, was not rated as important by our focus groups and OPA was only considered very important in some areas of the country and in certain breeds, but was not mentioned by others.

Supplementary feeding of rams was mainly based on body condition, with 69% of respondents always or mostly using this as their guide for the need to supplementary feed. This does mean of course that 31% do not use condition as a guide. Only 54% always/mostly fed in the run up to tupping and 20% during tupping meaning that most rams are left to maintain activity levels effectively 'off their backs' (by mobilising body reserves). Our farm data confirms that rams lose a significant (9% average) amount of body weight from pre to post tupping.

4.8 *Key performance indicators*

There is huge variation across the focus group farms both in terms of average ram flock life, lifetime output of lambs and hence the cost/lamb and per kg carcass produced. This means there is ample scope for improvement for many flocks. Calculating the rams lifetime contribution in this way means the financial impact can be examined between the best and the worst, benchmarks can be developed and further refined so farmers can compare their ram output to industry standards and potentially develop a multi-factorial matrix to guide producers to the optimum performance for the rams they purchase.

5 Summary of weaknesses identified

5.1 *Old age*

Old age was a major factor in both the culling and death of rams. This could explain why the average flock life is longer than the 'standards'; but the question is whether too many rams are dying or being culled due to old age and how much this is a compromise to welfare. In a parallel with ewes, the emphasis is on realisation of residual value which in turn reduces the numbers of ewes that are kept until they die, become infirm or too thin, all of which could constitute a welfare issue. It would seem that a similar approach is required for rams, combined with a greater uptake of 'MOTs' to establish fitness for breeding.

5.2 *Lameness*

Lameness remains a major reason for culling rams. This is not only expensive, it is a serious welfare issue and is also likely to be associated with reduced fertility and body condition. The use of Footvax and regular footbathing is relatively low suggesting scope for improvement in this respect.

5.3 Health planning and routine treatments

There is a clear need for improvement in this aspect of ram management. The main factors identified can be summarised as follows:

- ❖ Knowledge of health and treatments prior to purchase is generally quite low, yet health status is quoted as an important factor when farmers choose rams. This raises the question of what they think 'health status' means?
- ❖ Use of routine vaccination is not as widespread as might be expected. With animals costing an average of just over £500 in the main survey it is difficult to imagine that cost of vaccination is a barrier. The focus groups suggested that timing compared to ewe vaccinations was a practical issue. The causes of culling and deaths recorded suggest that this is an area that would help prolong ram working life, with for example respiratory disease and lameness high on the list.
- ❖ 'No apparent reason' was popular as a cause of death. Coupled with currently sparse information from post-mortem examinations, this suggests huge scope to encourage PMs and their reporting.

5.4 Quarantine

On a large proportion of farms quarantine procedures are not carried out effectively. Most of our respondents (76%) said they do quarantine rams, but 55% keep them in isolation for 2 weeks or less rather than the recommended 3-4 weeks minimum. The reasons given by our focus groups are two fold: firstly ram sales are too close to tupping to allow time, and secondly there is a high level of trust between purchaser and vendor, particularly when they buy direct from the breeders farm.

5.5 Knowledge of previous management

The knowledge that purchasers have of the previous management and health treatments of rams is generally poor. This raises the question of 'What do they consider is the health status of rams?' Is it just that they look healthy on the day of purchase? Diseases that are not obvious and yet can be tested for are not being recognised as major threats: only when an area/ breed has a significant issue, with for example OPA, are farmers taking any positive action. Sheep farmers need to be more aware of the hidden threats and tests available and need for prior knowledge so they can continue a rigorous health programme for rams.

5.6 Nutrition

Feeding is an area with significant scope for improvement as concluded by our focus groups and supported by the findings of the larger survey. The feeding of rams in the pre-tupping period is relatively common, but at other times it is much less clear cut. Feeding according to BCS was something a significant proportion of farmers said they undertook. The data from our farms where ram weight and BCS was recorded pre and post tupping suggests that on average rams lost 9% of their body weight and this corresponded to 0.5 BCS units (or 18% for 1 BCS), but the range in liveweight loss was wide with some rams losing over 20% of their body weight and 1.5 units of BCS. This suggests that BCS change may have a different scale compared to ewes (where 1 BCS has been estimated to be 10 to 13% of body weight), leading farmers to take less positive action post tupping, thinking the need for remedial action is lower. It is possible that the more extreme body conformation of terminal sire rams may hide true body condition and make assessment more difficult than in ewes. This has implications for the amount of feed (energy and protein) required for them to regain lost weight.

6 Recommendations and next steps

Based on the findings of this project, recommendations are as follows:

6.1 *Health management / planning*

The cost benefits of better health planning should be conveyed to commercial sheep farmers. The KPIs used in the project are vital in this respect. There is a need to understand what farmers actually perceive as 'health status' and seek to educate so this is aligned with tangible benefits of safe, clean rams coming on to farm.

Devise ways of overcoming the barriers identified by our focus groups, for example:

- Timing – encourage earlier purchases so quarantine and treatments can be carried out effectively. This should include the issue of timing of ram sales through markets.
- Seek ways to overcome the mis-timing of ram and ewe treatments that result in rams being missed out of vaccination programmes.
- Ram lameness has perhaps not received the same attention as in ewes. The 5 point plan for example should be adapted to provide a ram specific programme. A wider uptake of vaccination may also have impact – but this is dependent on diagnosis.
- There is potentially an important role for the veterinary surgeon. While small medicine packs may not be cost effective for Animal Health companies to support, veterinary surgeons can legally break packs and dispense smaller quantities. Demand needs to be generated by emphasizing the need to provide comprehensive vaccinations to rams
- This could be a real opportunity for vet involvement on sheep farms. The scope for cost reduction using the KPIs to demonstrate the benefits are possibly more clear cut and easily demonstrable compared to the more complex situation with ewe output. Alternatively the savings in ram turnover could be spent on better genetics.
- Ensure that rams have specific mention in health plans and seek to increase the uptake of vaccination in general.
- Look to develop a 'Clean bill of health' document (treatments, vaccinations and feeding) that vendors would complete and purchasers can use to guide treatments and feeding.
- Encourage more active culling, reducing the numbers culled on 'old age' and increasing those culled following assessment for fitness to breed (MOTs). Demonstrate the cost effectiveness of this approach.

6.2 *Feeding / nutrition*

There is a need for clear, more accurate guidance on ram nutrition and feeding levels. This may involve some R&D to highlight the energy and protein demands of rams compared to ewes. However in the interim the weight losses of rams should be further investigated and the current AFRC recommendations implemented to guide the need for supplementary feeding.

We can initially use the information generated by our small farm study which suggests that BCS in rams may be misleading and leading to an underestimate of the amount of weight lost during tupping.

A blueprint for BCS and weight changes and the sources of energy / protein, dry matters requirements is required along the lines of the AHDB Ewe BCS / KPI project (<http://beefandlamb.ahdb.org.uk/research/animal-nutrition/animal-nutrition-sheep/sheep-kpi-validation-project-phase-ii/>). This should include advice on how to manage rams in the transition period from the breeder's flock to the commercial flock. Purchasers need to know the diet that rams have been given before sale so that they can be acclimatised to their new diet and environment gradually.

6.3 Development of key performance indicators

Further development of the KPI dataset and sound benchmarks are required. These should then be integrated into breeding objectives for rams as well as the normal growth rate, fat depth etc. giving a much more rounded potential for rams in commercial flocks.

The mantra 'If you can measure it you can manage it' is just as true for rams. Providing farmers with the factors to measure and improving benchmarks over time will mean they can implement the technical improvements above and measure the cost benefits accrued.

The key measures are shown in the table below and these could be used to provide matrices to help encourage better health and nutritional management as producers monitor their rams' performance and costs against benchmarks. This will help give them confidence that keeping only fit, healthy and fully capable rams is the most cost effective strategy, even if it means a higher turnover of rams.

Ewe/ram ratio
Lambs/ram year (Ratio x lambing %)
Years/ram average
Lifetime output – lambs / ram
Cost/lamb produced
Cost p/kg carcass based on 20 kg

7 Acknowledgements.

The authors are extremely grateful for the funding for this project which was provided by the Norman Hayward Fund of the BVA Animal Welfare Foundation.

We would also like to thank all the farmers who contributed to the survey and in particular those who attended Focus group meetings, supplied detailed historical data and those who weighed and condition scored rams pre and post mating.

*LSSC Ltd Unpublished data

Authors: 1. Lesley Stubbings OBE, LSSC Ltd, Kettering, Northants
 2. Kate Phillips Consulting, Shrewsbury
 3. Chris Lewis, MRCVS, Audlem, Cheshire
 4. Phil Stocker, NSA, Sheep Centre, Malvern, Worcester