

Shetland Cattle: Breed Analysis Report; December 2015

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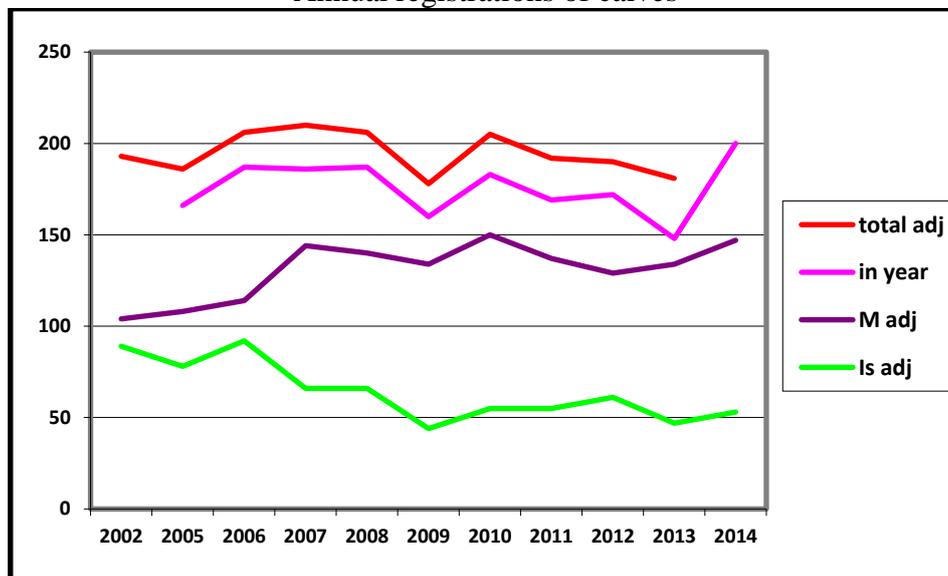
The first part of the annual report (herd sires and bull selection) appears separately as Breed Analysis Report Bulls December 2015 and therefore this section will deal with the broader aspects of breed conservation.

The report follows the approximate format of previous years in order to enable easy comparison.

Population trends

A preliminary review last year indicated the possibility that late registrations may make a significant difference to the trends of population of the breed measured by analyses of calves limited to those registered in the year of birth. Therefore a comparison of the two measures has been calculated (Figure 1). The obvious effect of the inclusion of late registrations (i.e. ‘total’) is to increase the number shown for each year by an average of circa 20 calves, although in 2014 there were 47 late registrations. However, there is negligible change to trends based only on calves registered in year of birth. The majority of late registrations were noted in Mainland herds (184) compared with only 67 in Islands herds during the period 2001-2014.

Figure 1
Annual registrations of calves



Annual calf registrations continue to be the preferred indicator of a breed’s security, and the 3-year rolling average can be used to estimate the breeding cow population. Using a factor that I proposed and have used for 20 years, the size of the breeding herd has been estimated in recent years at circa 700 cows and declining slightly, but the 2014 registrations have indicated a need to review that evaluation. Registrations of calves in year of birth recovered after the outbreak of FMD in 2001 and, apart from a dip in 2009 resulting from the impact of the economic downturn of 2007/8, held reasonably well until 2010. Thereafter registrations began to fall and the main cause probably was the increasing popularity of crossbreeding with

large continental bulls in the quest to improve financial returns, and this applied more frequently in the Islands where the fall in registrations shown by the annual analysis has been more severe. However, when the analyses are adjusted to take account of late registrations (Figure 1) a rather different picture emerges of the shifting balance between registrations in Shetland (Islands) and those on the mainland of UK (Mainland). The Mainland population continued to grow after 2002 attaining a peak in 2007 after which it seemed to reach a plateau. In contrast the Islands population fell between 2006 and 2009 but then also stabilised and maintained its size. Consequently, the current status is more reassuring although the Islands population remains too small for comfort.

Genetic analyses

GCI (effective founder number):

It is inevitable that every breed will suffer some genetic loss, with the associated decline in within-breed diversity, as a result of ‘genetic drift’. The main causative factors are inbreeding and declining GCI. **Inbreeding** has been explored in previous reports and its potential dangers are well documented, but the dangers need to be kept in perspective. Inbreeding can be a positive factor in the improvement of a breed provided it is applied as linebreeding (i.e. concentrating the influence of an outstanding ancestor) and is not taken to extreme levels. Programmes which focus too heavily on the control of inbreeding (sometimes expressed as kinship) can be counter-productive. In the same context, it is acceptable and desirable that good bulls should be used more heavily as their contribution to the improvement of quality through the breed is likely to be greater than any negative effects. Bulls that fall into this category were identified in the section of the report that appeared in the last newsletter, and the best bulls should not be discarded until their genetics have been firmly established. These reports provide a safety net by giving early warning of any undue dominant influences and potential genetic bottlenecks.

GCI is not understood so well, but it is at least as important as inbreeding. It is the effective founder number and measures the contribution of the founder animals to the current population. Almost 100 founders were identified when the current herd book series was published in 1981 (Table 1) and ideally every founder should make an equal contribution. Inevitably the contributions are not equal and the degree of inequality, accentuated by the total loss of some lines, is measured as GCI (a high figure is desirable). GCI of the Shetland cattle breed has been measured since 2001 (Table 1) and, although gradually declining, it shows a relatively healthy state (c.32) compared with many other rare breeds.

Table 1
Loss of Founders 1981-2014

Measure	1981	1999	2001-4	2005-9	2010-4
Active ancestors and founders		798	905	1094	1348
Active male founders*	28	25	25	25	25
Active female founders*	66	53	53	49	48
Total active founders*	94	78	78	74	73
GCI			32.86	31.56	31.72

*figures may vary slightly from earlier versions as a result of recent update

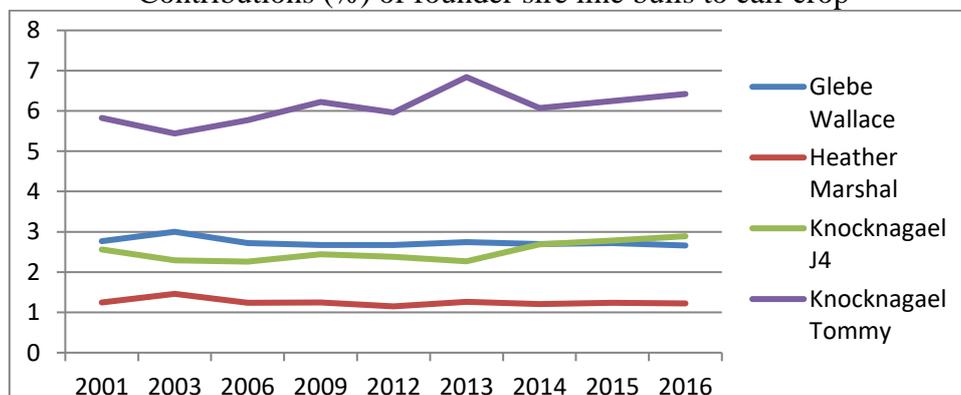
Loss of contribution from a founder (i.e. extinction of that line) is a significant and irretrievable loss. As stated in the report last year, the “number of active founders can vary a little from year to year depending on which calves are registered, and occasionally an apparently extinct family can re-emerge.” There was significant loss of founders from the population that produced the entries in the 1981 herd book to the end of the century (3 males

and 13 females) (Table 1), but thereafter the loss has been very slight [no male and 1 female] up to the present time. The single female loss seems to be the Knocknagael Mary family (and associated Daisy descendants) which has not made a contribution for 13 years, but other lines have been only intermittently active, notably dam of Westerhouse Debra (IS) last active 2002, Carrbank Myra Alice (only a branch of Glebe Hebe family) and Doreholm Rhoda (IS) last active 2004, Isleburgh Hazel (IS) last active 2006, and Isleburgh Heather (IS) last active 2009. Research on two Knocknagael families, Priscilla (Angela) and D4 (Doreen) is still in progress. Any information on these families would be very welcome. However, it reflects very favourably on the attention paid to genetic conservation by breeders of Shetland cattle that since 2001 no bull lines have been lost and only one cow family.

Bull line founders and HB Volume One representatives:

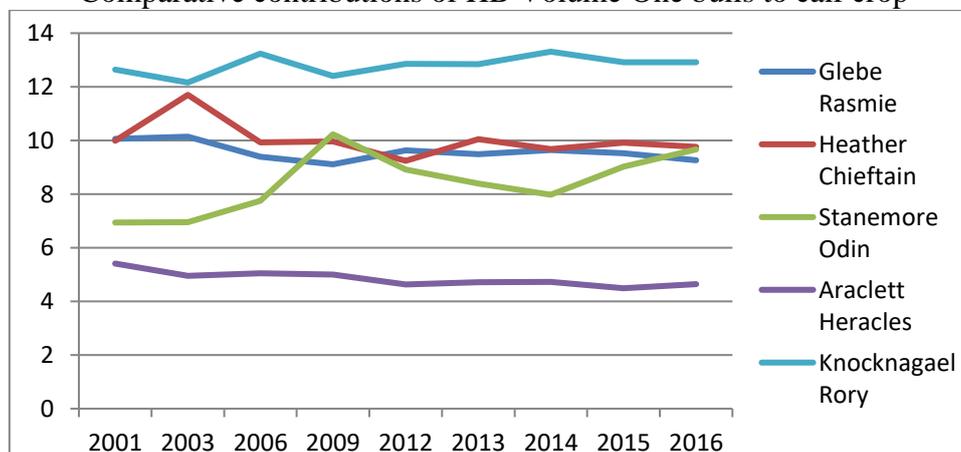
Figures 2 and 3 continue to be included as reference points. Contributions of the four founder bulls (Figure 2) and the Volume One (1981) representatives (Figure 3) have remained relatively constant. Knocknagael Tommy has the greatest influence among the ‘Founder line’ bulls, and his influence is increasing gradually, but it is not a matter for concern.

Figure 2
Contributions (%) of founder sire line bulls to calf crop



There is good balance of influence among the bulls which are the representatives of the four lines in the Herd Book (Figure 3). Glebe Rasmie, Heather Chieftain and Stanemore Odin cluster closely. The Araclett line is not so straightforward, for reasons stated in the last review, but an average between Rory and Heracles gives a figure comparable to the other lines.

Figure 3
Comparative contributions of HB Volume One bulls to calf crop



Note: The contributions shown in Figures 2 and 3 are for comparative purposes only between animals in each Figure. They can not be compared with the % figures in other Tables.

Rasmie and Boris

The first part of this report ('Bull Analysis Report'), published in the previous issue of the newsletter, made reference to the influence of Collafirth Rasmie (92.1540) and Templeson Boris (93.1680). Although the negative effects of this influence have been analysed in several reports, it might be helpful to place it more in context. Is it still a problem? Does it justify attention in breeding programmes? It is not a problem in herds on the Mainland where other quality bulls from the late 1980s and early 1990s exert a comparable influence, namely Murrister Tim (87), Waterloo Charlie (88), Troswick Beach (89) and Hjem Lowrie (92). On the other hand, on the Islands not only is the contribution of these bulls much lower than that of Rasmie and Boris, but the latter also remain significantly higher than those of important earlier bulls such as Boxmoor Fearless (84) and Cova Karl (85).

Table 2
Changing influence of four bulls 2003-2014

Bull	Location	2003	04-06	07-09	12-14	%+/- 03-14
Collafirth Rasmie	Islands	7.55	10.40	8.72	7.69	+1.85
Collafirth Rasmie	Mainland	3.63	2.91	3.46	2.85	-21.49
Templeson Boris	Islands	5.38	6.00	6.21	7.87	+46.28
Templeson Boris	Mainland	4.46	4.60	4.13	3.09	-30.72
Couster Copper	Islands	5.29	3.21	4.69	4.49	-15.12
Couster Copper	Mainland	1.33	1.69	1.70	2.67	+100.75
Isleburgh Dexter	Islands	4.29	1.66	2.24	1.08	-74.83
Isleburgh Dexter	Mainland	1.58	1.58	2.37	2.63	+66.46

The overall picture, combining the Mainland and Islands results, shows the individual influence of Rasmie and Boris still exceeds that of their contemporaries from the early 1990s (Table 2). A more detailed look at the influence of Rasmie and Boris in comparison with two contemporaries (Couster Copper 90.0290 and Isleburgh Dexter 92.1374) shows a definite trend from 2003 to 2014 although there are fluctuations as shown by the insertion of results for interim 3-year blocks. On the Islands the contribution of Boris has risen more consistently and significantly than that of Rasmie, while Dexter's fall was steeper than Copper's. On the Mainland the trends are reversed. Rasmie maintained his initial level of contribution until 07-09 but then declined, while Boris' decrease was more consistent and greater. Conversely the contribution of both Copper and Dexter increased steadily. In summary, the overall influence of Rasmie and Boris has fallen since the first reports were prepared, but still remains a concern on the Islands.

Young bulls

The review of young bulls to watch was discussed in the section of the report published in the previous newsletter, and therefore this part focuses on an analysis of the 2014 crop of calves as an indication of the choice of herd sires in 2013 which were the main influences. In recent years it has been more usual in the Islands to use young bulls, but the list of bulls breeders intended to use in 2013 (i.e. sires of 2014 crop) included several older bulls of quality, such as Gillarunna Innes, Trondra Arrow, Gillarunna Nocturne and St Trinians Balou, which

demonstrates a willingness to maximise the capture of superior genetics, although the effect of Balou has not yet been sufficiently realised.

Influence of young bulls on 2014 crop of calves

Please note that this report is primarily a historical review. Recommendations for selection of herd sires and 2016-born bull calves to watch were discussed in the report in the previous newsletter.

Mainland

The young bulls prominent in the analysis of the 2014 crop of calves (Table 3) are a ‘halfway house’ between the two previous years. The 2012 crop of calves showed an increase in the influence of the dominant lines from the Islands, while the 2013 crop indicated a return to a balance of bloodlines. The 2014 crop still betrays some evidence of the dominant Islands lines. The grey 2010 bull, Collafirth Viking, comes from the Hillwell sire line and his ongoing influence through the 2012/3/4 crops should sound a warning bell, while the pedigree of Lyndthorpe Erik is concentrated heavily on the Heather and Glebe lines that are favoured in Islands herds. On the other hand the presence of Trondra Arrow and Gillarunna Nocturne brings welcome quality, and both were mentioned in the earlier ‘bull selection’ section of the report. Arrow is a son of Collafirth Laxness, and Nocturne has a good balance of lines although perhaps rather too much Collafirth Rasmie. Balearn Tavish (son of Nocturne) also has a reasonably good balance of lines although the influence of Huxter is too strong. Hollins Jack of Hearts is a red bull from the Knocknagael line. There are three St Trinians bulls with Darren probably being the pick of the group.

Table 3
Contribution of young bulls to 2014 crop of calves on the Mainland
(2013 figure in brackets)

Bull	Born	Contribution	Notes
Trondra Arrow	2009	4.08 (0.93)	Son of Collafirth Laxness
St Trinians Leroy	2010	3.23 (0.93)	
Collafirth Viking	2010	2.89 (3.01)	Grey; Hillwell sire line
St Trinians Dennis	2012	2.72 (----)	
St Trinians Darren	2010	2.55 (1.39)	
Gillarunna Nocturne	2008	2.38 (0.93)	Good balance of lines
Balearn Tavish	2012	2.38 (----)	Son of Trondra Arrow
Lyndthorpe Erik	2011	2.38 (1.39)	Concentrated Heather influence
Hollins Jack of Hearts	2010	2.04 (0.93)	Red

Islands

It was noted last year that the leading young sires on the Islands were based predominantly on the Rasmie/Boris/Huxter axis. The same situation has continued to some extent with the 2014 crop of calves, but additionally Lyndthorpe Raymond has exerted a significant influence since the 2012 crop of calves. Raymond is linebred to Boxmoor Fearless and is concentrated heavily on the Heather bloodline which already is over-represented in the Islands. Minarvi Nicol has similar breeding to his sire (Raymond) but less intense. Gerraquoy Lulach is similar to Raymond in the level of his influence during the past three years, and is a grandson of Hillwell Huxter, while Minarvi Danny carries a combined influence of more than 25% from Collafirth Rasmie and Templeson Boris, and Geldron Aert even more (41.5%) from the same bulls. Ustaness Quince, which leads the list, and Carn Bhren Goblin, a son of Gilarunna Innes, offer balancing bloodlines.

Table 4
 Contribution of young bulls to 2014 crop of calves on the Islands
 (2013 figure in brackets)

Bull	Born	Contribution	Notes
Ustanness Quince	2008	11.32 (7.50)	Son of Collafirth Laxness
L'thorpe Raymond	2010	8.49 (6.25)	Linebred to Boxmoor Fearless; concentrated Heather influence
Minarvi Danny	2011	6.60 (----)	Concentrated Rasmie, Boris and Huxter
Gerraquoy Lulach	2010	5.66 (7.50)	Grandson of Hillwell Huxter
Minarvi Nicol	2012	5.66 (----)	Son of Raymond
Carn Bhren Goblin	2012	3.77 (----)	Son of Gillarunna Innes
Geldron Aert	2012	3.77 (----)	Grey/white; Hillwell sire line; concentrated Rasmie and Boris
Ustanness Thor	2011	3.77 (----)	Son of Quince

Please note again: these contributions are for comparative purposes only between the animals in Tables 3 and 4. They can not be compared with the results in Figures 2 and 3.

Conclusions

It remains to be seen whether the upsurge in registrations in 2014 (200 plus 47 late registrations) is an isolated phenomenon, or whether it presages an upturn in the breed's fortunes. In either case it excites optimism and provides encouragement. The ongoing Boris / Rasmie bottleneck on the Islands has been noted, but it should not be allowed to overshadow the positive elements of this report. Wider interest in the breed, creation of the Zetralia herd in the Antipodes, and new developments on the website allowing members to evaluate bulls more precisely (see report in previous newsletter), all indicate a breed on an upward trend. We will hope for a successful calving this year and some quality calves to take the breed forward to the next generation.