Breed Analysis Report for Shetland Cattle; October 2010

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Last year I gave a rather downbeat report on the trends for Shetland cattle, but this year I have a much more positive feeling, with one major exception which I will deal with later. I had the privilege to judge at the Cunningsburgh Show this year as part of the Herd Book Society centenary. It was an uplifting experience, not only because of the excellent Island hospitality and the opportunity to see old friends again, but also because of the quality of the cattle in the showring. There was diversity in type and colour, and quality was present in every class. I hope it was a foretaste of success for the breed in the next hundred years.

Population trends

The trend which gave the greatest concern last year was the decline in registrations on the Islands. This year the decline has accelerated. I suggested last year that the trend appeared to be driven by economic factors and crossbreeding. I have not received any feedback to confirm or dispute my suggestion, and a clear analysis is necessary in order to make sensible decisions on conservation policy. It may be that fluctuations occur from year to year because of registration delays or changes in herd policy, but the maintenance of an effective breeding population of the breed in its natural environment on the Islands must be a high priority.

The overall number of Shetland registrations remained relatively constant until 2008, but the fall in total numbers seen in the 2009 results (Table 1) reflects the continuing fall in Island registrations. Less than 25% of registrations in the latest Herd Book came from the Islands, and I would recommend that this question should be addressed with some urgency. The centenary celebrations included a seminar which detailed many of the strengths of Shetland cattle. They are thrifty, ideal for conservation grazing and producers of quality (healthy) beef. Their functional efficiency and local adaptation need to be exploited. It is difficult to reconcile the continuing decline in registrations with the undoubted qualities of the cattle.

Table 1
Annual registrations of calves

	2002	**2004**	**2006**	**2008**	**2009**
Islands	89	75	87	60	37
Mainland	104	109	100	127	123
Total	193	184	187	187	160

Genetic analyses

Shetland cattle compare quite favourably with many other endangered breeds of cattle with regard to genetic diversity, which is the fundamental benchmark of health and sustainability. Maintenance of genetic diversity is important, and the current situation owes much to those breeders who maintained the cattle through difficult times in the past. There was discussion at the centenary workshop regarding breeding policy, and it was encouraging to hear breeders expressing an awareness of the need to maintain a wide genetic base and avoid the dangers of more intensive selection from the use of BLUP and other techniques more attuned to breeds with a large population. BLUP (best linear unbiased prediction) is a complicated statistical technique which attempts to remove environmental effects so that PBVs (predicted breeding values) can be based on genetic factors. It is used in large populations where valid conclusions can be reached. It is less applicable in small populations for several reasons including requirement for consistent management across groups, requirement for adjustments to records, and the danger that identification of 'elite' animals could lead to their over-use and deplete diversity within the breed.

Effective founder number (EFN):

The statistics of founders and ancestors may seem dry and irrelevant to owners of cattle who are more interested in living animals, but they do provide a useful background to the genetic health of the breed. The slight downward trend in EFN noted recently has been halted this year, and a founder has re-appeared in the lists (Table 2). These are encouraging trends. On the other hand, the expected increase in the number of active ancestors has not occurred, and this probably reflects an underlying increase in inbreeding.

Table 2
Measures of within-breed diversity

Measure	**2002**	**2004**	**2006**	**2008**	**2009**
Effective founder number	32.83	32.26	31.54	31.15	31.62
No. of active founders	80	80	76	76	77
No. of active ancestors	871	905	1011	1094	1056

Increased inbreeding in the longer term will be a natural consequence of a genetic bottleneck in the breed, and previous mention has been made of the need to use bulls to counteract the dominance of Collafirth Rasmie and Templeson Boris. The analysis below indicates that this is happening.

Bull line founders:

Once again, Table 3 is included simply as a reference point. The contributions of the four founder bulls remain relatively constant.

Table 3
Contributions (%) of founder sire line bulls to calf crop

Bull	**2002**	**2004**	**2006**	**2008**	**2009**
Glebe Wallace	2.87	2.68	2.72	2.72	2.67
Heather Marshal	1.39	1.19	1.24	1.24	1.25
Knocknagael J4	2.39	2.40	2.26	2.29	2.44
Knocknagael Tommy	5.70	5.85	5.77	5.96	6.22

Herd Book Volume One:

The Volume One (1981) representatives of the four bull lines in the New Foundation Herd Book (Glebe Rasmie, Heather Chieftain, Stanemore Odin and Araclett Heracles) were born 35-40 years ago, and thus on average six generations or more have passed to the current crop of calves. The contributions from these bulls usually change only slightly from year to year, but this year there has been a noticeable increase in the contribution from Stanemore Odin (Table 4). It seems this probably results from ongoing recognition on the Islands of the quality of Murrister Olympus/Waterloo Charlie genetics, although bulls such as Troswick Beach also had a good reputation.

Table 4
Contributions of HB Volume 1 bulls to calf crop

Bull	**2002**	**2004**	**2006**	**2008**	**2009**
Glebe Rasmie	9.85	9.59	9.39	9.41	9.11
Heather Chieftain	11.11	9.51	9.93	9.95	9.96
Stanemore Odin	7.15	7.95	7.75	8.49	10.23
Araclett Heracles	5.47	5.20	5.05	5.02	5.00

Note: These contributions are for comparative purposes only between the animals in Table 4. They can not be compared with the % figures in Tables 3, 5 and 6.

Young bulls:

There has been a significant positive change in the Islands with regard to the spread of bloodlines in the most popular sires, counterbalanced to a degree by a negative effect on the Mainland.

Regional effects

Mainland

The concentration of bloodlines on the Mainland, noted last year, has continued. The two most influential young sires (i.e. Herd Book entry 2000 or later) were Pywacket Bertgan and Wild Meadows Freddie, both of which featured prominently last year. They (and their close relatives) are joined in the lists this year (Table 5) by Hillwell Nonny (from the dominant Island tribe) and Henbant Hero (a grandson of Templeson Boris). This continues to be a matter for concern.

There may not be an abundance of bulls providing the opportunity to break out of this situation, but the 2009 Herd Book (volume 29) has entries for Randolph Fergus (born 2007), who is a potential AI bull, and Lincwold Fergal (born 2006). These bulls need to have wider use to counter-balance the Bergtan/Freddie effect.

Table 5
Influence of young bulls on 2009 crop of calves on the Mainland

Bull	**Year of birth**	**Contribution**	**Notes**
Pywacket Bertgan	2005	5.69	
Wild Meadows Freddie	2003	5.78	
St Trinians Edward	2000	3.05	sire of WM Freddie
St Trinians Red Hot Pepper	2000	3.00	g'sire of P Bertgan
St Trinians Domino	2002	2.85	sire of P Bertgan
Hillwell Nonny	2004	2.85	
Oxclose Sporticus	2006	2.85	
Henhant Hero	2001	2.64	g'son of T Boris

Islands

There has been a remarkable change in the situation on the Islands. The change may have been accentuated by the smaller number of registrations, but it is significant nevertheless. The lists (Table 6) are headed by Trondra Donnie and his sire, Isleburgh Alf, who bring new elements to the lists. In addition, Knocknagael Charlie brings the quality of his sire, Waterloo Charlie, and Schiehallion Hornby is a grandson of

Struiehill Saturn (whose inclusion has been recommended previously). Collafirth Laxness, now unfortunately deceased, had a desirable blend of bloodlines and (as noted last year), if colour is a factor of interest, he was from the sireline of Murrister Pete who had grey markings. Therefore only Hillwell Nonny is a carry-over from the Arcus concentration noted last year, although we need to be aware that Nonny also is in the Mainland lists.

Table 6
Influence of young bulls on 2009 crop of calves on the Islands

Bull	**Year of birth**	**Contribution**	**Notes**
Trondra Donnie	2007	12.16	
Isleburgh Alf	2001	8.78	sire of T Donnie
Knocknagael Charlie	2007	8.11	son of W'loo Charlie
Hillwell Nonny	2004	7.43	son of H Arcus
Collafirth Laxness	2003	6.76	
Schiehallion Hornby	2007	4.05	g'son of St'hill Saturn

Please note again: these contributions are for comparative purposes only between the animals in Tables 5 and 6. They can not be compared with the % figures in Tables 3 and 4.

Conclusions

My experiences at the centenary celebrations and the Cunningburgh Show are the strongest impressions of the year, and give cause for optimism. My reservations relate to the evidence of a bloodline restriction on the Mainland, but mainly to the declining registrations on the Islands. I hope the latter will be a temporary phenomenon.