

Breed Analysis Report for Shetland Cattle; September 2009

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Previous reports usually have given mixed messages. Long-term positive trends have been mixed with short-term negative threats; good news in one area has been compromised by disappointing results elsewhere. This report follows the same general pattern, except perhaps that the negative items have become more prominent and demand closer attention.

Population trends

Attention was drawn last year to the possibility that a downward trend of registrations on the Islands might be developing. The category of 'risk' for each native breed is based on the number of new female registrations on a three-year rolling average. New registrations are a much more accurate measure of the health of a breed than breeding cows, as they indicate the level of confidence of breeders in the current environment. Currently the Shetland is categorised by RBST as 'At Risk' (category 4) which indicates annual female registrations of 112-187 calves.

The overall number of Shetland registrations remained relatively constant during recent years (Table 1), and continued at the same level in 2008. However, the increasing imbalance between the Islands and the Mainland, noted in the previous report, has widened further. During the six years 2002-2008 new registrations on the Islands have fallen from 89 calves per annum (46% of total) to 60 calves (32% of total). The 2008 number was the lowest recorded during this period. In contrast new registrations on the Mainland have risen from 104 calves (54% of total) to 127 calves (68% of total).

Table 1
Annual registrations of calves

	2002	2004	2006	2008
Islands	89	75	87	60
Mainland	104	109	100	127
Total	193	184	187	187

This trend appears to be driven by economic factors and crossbreeding. Last year I asked for feedback from breeders/owners to let me know your thoughts and explanations. I remain interested to hear, and hopefully to develop strategies and programmes to deal with any fundamental problems that can be identified before they move beyond control.

It is especially important as the downward trend is on the Islands, and I repeat my comments in the previous report: “it is essential within the overall population that Shetland cattle are maintained in their area of origin and their natural environment. Although a wide geographical spread is desirable in the context of security when threatened by disease epidemics, the maintenance of the breed on the Islands is important to ensure that its distinctive characteristics are not lost.”

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. Little change had been noted in previous analyses, but now there is the suggestion of a slight negative trend.

Effective founder number (EFN):

Last year I noted some indication that the EFN had fallen, and that is confirmed by the 2008 results (Table 2). Although the fall is not large, it is developing a pattern of a fall of c. 0.2 per annum. When this is combined with the measure of unequal contributions of founders, and the likely loss of one or two female founder lines, it is possible that a negative pattern is emerging.

Table 2
Measures of within-breed diversity

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

At this point drastic action is not recommended, but it reinforces the need to avoid the possibility of any genetic bottlenecks in the current population. These will be caused by undue concentration on some lines, rather than by a small population. The ongoing threat of a genetic bottleneck in the breed revolves around the dominant influence of three bulls, Collafirth Rasmie, Templeson Boris and Hillwell Huxter (the first two on both the Mainland and Islands, the third mainly on the Islands). There needs to be active use of bulls which provide a counter-balance to these bulls.

Bull line founders:

I include Table 3 simply as a reference point. The contributions of the four founder bulls remain constant.

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

Bull	2002	2004	2006	2008
Glebe Wallace	2.87	2.68	2.72	2.72

Heather Marshal	1.39	1.19	1.24	1.24
Knocknagael J4	2.39	2.40	2.26	2.29
Knocknagael Tommy	5.70	5.85	5.77	5.96

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. Consequently, these Volume One bulls still appear regularly in current extended pedigrees; more frequently on the Mainland than on the Islands where there has been a practice of favouring a more rapid turnover of breeding animals. Therefore, they are sufficiently recent for breeders to be able to evaluate them in the context of their present breeding policies, and the slight changes in the relative contributions of the bulls during the past six years (Table 4) probably reflects deliberate selection policies by breeders.

Table 4
Contributions of HB Volume 1 bulls to calf crop

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

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:

Previous reports have identified young bulls which had the potential to counteract the recent genetic ‘bottleneck’ that has been described. Bulls such as **Tivis Hill Keen** on the Mainland or **Struiehill Saturn** on the Islands were noted as important sires and it is encouraging to see sons of these bulls being used with good effect, while Tivis Hill Keen continues as a herd sire.

Regional effects

Mainland

The most popular young sires of the 2008 calf crop (Table 5) suggest that a trend of concentrating bloodlines may be commencing on the Mainland. The most influential young bull, Wild Meadows Freddie, is joined in the ‘top 6’ by two of his sons. This alone is a cause for some concern, but it is compounded by the negative contribution of these most popular young bulls to overcoming the bottleneck threat that has been

highlighted in previous reports. St Trinians Adam is the main exception and exerts a positive influence, but continued use of WM Freddie and his relatives will create a problem for the breed. The use in important herds of bulls such as Henbant Hero (2001), a close relative of both Boris and Collafirth Rasmie, further accentuates the problem.

This shift of emphasis potentially creates a problem similar to that which exists on the Islands, even though the two populations concentrate on different lines. The only link to breeding on the Islands among these bulls is Struiehill Saturn.

Table 5
Influence of young bulls on 2008 crop of calves on the Mainland

Bull	Year of birth	Contribution	Notes
Wild Meadows Freddie	2003	5.12	
Rowland Rob Roy	2006	5.12	son of W M Freddie
Pywacket Bertgan	2005	4.33	
St Trinians Adam	2003	3.54	son of Struiehill Saturn
Greenoak Gyges	2006	2.76	
Holtside Oaks Augustus	2005	2.25	son of W M Freddie

In view of this potential problem, it is essential that young bulls on the Mainland with a positive genetic impact are identified, and maybe added to the Semen Bank. In this context, bulls such as **Tivis Hill Keen**, **Carrbank Morris** and **Lincwold Fergus** are high priorities.

Islands

The concentration of bulls down the Hillwell Arcus line has continued and they have increased their dominance. Four bulls in the ‘top 6’ are sons or grandsons of Arcus (Table 6), and serve to concentrate further the dominant influence of Collafirth Rasmie. Combined with the declining registrations on the Islands, this represents a very real threat to the genetic health of the breed.

Table 6
Influence of young bulls on 2008 crop of calves on the Islands

Bull	Year of birth	Contribution	Notes
Hillwell Luddy	2002	11.25	son of H Arcus
Hillwell Nonny	2004	7.50	son of H Arcus
Collafirth Laxness	2003	6.25	
Hillwell Mercury	2006	6.00	gson of H Arcus

Collafirth Sneuli	2006	4.17	son of H Luddy
Gillarunna Ivor	2006	2.50	

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.

Two bulls of the Islands six young bulls in Table 6 provide the opportunity to break out of the Rasmie/Huxter/Boris restriction. As mentioned previously, **Collafirth Laxness** (2003), now unfortunately deceased, had an excellent blend of bloodlines and, if colour is a factor of interest, he was from the sireline of Murrister Pete who had grey markings. A son of Laxness, out of a cow of similar bloodlines, would help to spread the genetic base of the breed on the Islands. **Gillarunna Ivor** (2006), like his sire (Gillarunna Haaki) also offers a good blend of bloodlines.

None of these bulls currently are represented in Mainland breeding, but Laxness has a son (Ustaness Petroni) working on the Mainland. Unfortunately he is out of a cow with a strong Huxter influence and therefore not helpful in overcoming the current problem.

Conclusions

Three important messages emerge from this report:

- 1) Negative factors are becoming more prominent. The warnings given in previous reports appear to have gone unheeded. The use of bulls such as **WM Freddie** and **Henbant Hero** on the Mainland, and the **Hillwell Arcus** line on the Islands, is creating a dangerous situation. Please be aware of this situation.
- 2) A need to select bulls to counteract the genetic bottleneck(s). Again, these have been identified in previous reports. Do not hesitate to ask for advice on genetic background before purchasing.
- 3) The need to ensure the breed remains strong in its area of origin.