

Breed Analysis Report for Shetland Cattle; October 2008

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Previous reports have concentrated on the genetic diversity of the breed. It is fully recognised that a narrowing of the genetic base of a numerically small breed has potential dangers, and these relevant issues will not be ignored. They are discussed later in this report, but first there is a need to examine the health of the breed as shown by population trends.

Population trends

The results used to determine the category of 'risk' for each native breed is based on the number of breeding females. This previously was derived from survey data, but now reflects 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, as they indicate the level of confidence of breeders in the current environment. Currently the Shetland is categorised as 'At Risk' (category 4) which indicates annual female registrations of 112-187 heifer calves.

The number of Shetland registrations has remained relatively constant during recent years (Table 1), but the balance between the Islands and the Mainland has shifted. During the six years 2002-2007 new registrations on the Islands have fallen from 89 calves per annum (46% of total) to 64 calves (34% of total). The 2007 number was the lowest recorded during this period, and there may well be a recovery next year, but the overall trend is down. In contrast new registrations on the Mainland have risen from 104 calves (54% of total) to 122 calves (66% of total).

Table 1
Annual registrations of calves

	2002	2003	2004	2005	2006	2007
Islands	89	83	75	70	87	64
Mainland	104	95	109	96	100	122
Total	193	178	184	166	187	186

What possible reasons can there be for this shift in regional emphasis? There are factors which could be responsible for increased popularity of the breed on the Mainland. The value of the Shetland cattle in conservation grazing could have played a part, or the increasing emphasis on non-intensive grazing systems. It would be interesting to have feedback from members who either are new breeders, or who are increasing the numbers of their cattle, to know the reasons behind their decisions.

However, 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

The update on previous analyses shows little change in the genetic structure of the breed, and no new danger points have been identified.

Effective founder number (EFN):

There is some indication that the EFN has fallen in the last six years (Table 2), although the fall is not consistent, and is not a cause for serious concern at present. A further measure of unequal contributions is the number of dominant founders, and it is worth repeating that “only eight founders (3 bulls and 5 cows) together have contributed more than 40% of the ancestry of the calf crop”. It seems that there may have been a loss of the influence of four founders, as 80 active founders were recorded 2002-2004 but only 76 in 2005-2007.

Table 2
Measures of within-breed diversity

Measure	2002	2003	2004	2005	2006	2007
Effective founder number	32.83	33.96	32.26	31.47	31.54	32.04
No. of active founders	80	80	80	76	76	76
No. of active ancestors	871	853	905	909	1011	1051

Bull line founders:

The four ‘bull line founders’ (Glebe Wallace, Heather Marshal, Knocknagael J4 and Knocknagael Tommy) continue to maintain a constant position from year to year (Table 3). The change in these figures has been minimal since the analyses were started, and therefore they add little to the discussion. I propose to discontinue this table unless anyone finds it of use or interest.

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

Bull	2002	2003	2004	2005	2006	2007
Glebe Wallace	2.87	3.00	2.68	2.76	2.72	2.80
Heather Marshal	1.39	1.46	1.19	1.29	1.24	1.28
Knocknagael J4	2.39	2.29	2.40	2.20	2.26	2.33

Knocknagael Tommy	5.70	5.44	5.85	5.78	5.77	5.96
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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) also have maintained a reasonably constant position during the last six years (Table 4), although there are signs that Stanemore Odin has strengthened his position. This appears to result from a stronger representation of Murrister Olympus and Waterloo Charlie progeny on the Islands.

These figures probably are of greater interest, partly because there is some movement in the relative positions of the bulls, and partly because they are sufficiently recent for breeders to be able to relate them to their cattle.

Table 4
Contributions of HB Volume 1 bulls to calf crop

Bull	2002	2003	2004	2005	2006	2007
Glebe Rasmie	9.85	10.14	9.59	9.54	9.39	9.97
Heather Chieftain	11.11	11.70	9.51	10.31	9.93	10.24
Stanemore Odin	7.15	6.95	7.95	7.40	7.75	8.58
Araclett Heracles	5.47	4.95	5.20	5.26	5.05	5.23

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. Struiehill Saturn has sons on both the Islands (Minarvi Bobby) and the Mainland (St Trinians Adam), while Carrbank Dominic and Lincwold Zac are sons of Tivis Hill Keen.

Regional effects:

Mainland

The most popular young sires of the 2007 calf crop (Table 5) provide a choice of a variety of lines and genetic combinations. Sires such as **Lincwold Zac** (2001), **Carrbank Dominic** (2002), **Greenoak Erebus** (2005) and **St Trinians Adam** (2003) have good credentials from a genetic point of view and their use is recommended. The use of all these bulls on the Mainland is essential as they are completely absent from the pedigrees of Islands cattle.

Table 5
Influence of young bulls on 2007 crop of calves on the Mainland

Bull	Year of birth	Contribution	Notes
St Trinians Adam	2003	3.69	son of Struiehill Saturn
Templeson Lorenzo	2003	3.28	
Carrbank Dominic	2002	2.97	son of Tivis Hill Keen
St Trinians Nameless	2003	2.87	
Greenoak Daedalus	2003	2.66	
Greenoak Erebus	2005	2.46	
Lincwold Zac	2001	2.25	son of Tivis Hill Keen

Islands

There is a continued concentration of bulls down the Hillwell sire line. In the report last year, attention was drawn to the powerful Arcus influence, which was reinforced by his two sons, Luddy and Nonny, and these bulls concentrated the dominant influence of Collafirth Rasmie. This year they are joined by Geordie, who is inbred closely to Rasmie, and by Isleburgh Francis who is closely inbred to Hillwell Huxter.

Three bulls on the Islands list provide the opportunity to break out of the Rasmie/Huxter/Boris restriction. As mentioned previously, **Collafirth Laxness** (2003) has an excellent blend of bloodlines and, if colour is a factor of interest, he is from the sireline of Murrister Pete who had grey markings. **Gillarunna Hakki** (2000) also offers a good blend of bloodlines. In addition, **Minarvi Bobby** (2005) is a son of Struiehill Saturn, who has been identified in previous reports as an important sire.

Table 6
Influence of young bulls on 2007 crop of calves on the Islands

Bull	Year of birth	Contribution	Notes
Hillwell Arcus	2001	10.16	ggs of Rasmie
Hillwell Luddy	2003	6.25	son of Arcus
Gillarunna Hakki	2000	5.86	
Hillwell Geordie	2005	5.47	inbred to Rasmie
Hillwell Nonny	2004	5.47	son of Arcus
Islesburgh Alf	2001	5.47	
Collafirth Laxness	2003	3.91	

Islesburgh Francis	2002	3.91	inbred to Huxter
Minarvi Bobby	2005	3.91	son of Struiehill 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.