Shetland Cattle: Breed Analysis Report; December 2019

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This report continues to be a team effort and I am grateful not only to Alan Yarker but also to all members who have provided information, especially to Peter Hardman, Paddy Zakaria, Steph Ede, Maggy George, Mike Sandison, Sue Shadrick and Brigid Tucker. I have followed again the format of previous years as this facilitates useful comparisons and highlights important trends. The first section deals with historical population trends, genetic analyses and analysis of the 2018 calf crop. The second section deals with bull selection to maximise breed improvement and within-breed diversity.

The initial analyses of calves born in 2018 have provided information which gives a picture of trends – good and bad – that are discussed in the body of this report. The diligence of the breed 'surveyors' enabled them to identify not only bulls that were used in 2017, but also younger bulls (including those born in 2019), and I have focused this review on the animals at the extremes of the analyses and evaluation. There are many other bulls listed which fall between the extremes and they have not been evaluated in detail as it would have rendered the report too complex.

Shetland cattle have enjoyed useful publicity recently and I have ensured the breed has its full share of attention to the best of my ability. I have made mention previously of the 'World Encyclopaedia of Livestock Breeds and Breeding' (published by CABI) where almost a full page is devoted to the breed, but two other books published during the past year (in both of which I am involved) provide details of the Shetland's merit. An unauthorised biography ('Anarchy or Establishment' published by Hayloft Publishing) included some moments of mild embarrassment for me but the attention of the author to Shetland cattle highlighted the success of the breed in terms of both productivity and genetic diversity. He compared it favourably with a popular international breed, the Thoroughbred horse, and with another native British cattle breed, the White Park. Despite the huge disparity in population size (the TB has more than 200,000 breeding mares) the Shetland has a superior analysis in terms of 'genetic health' and diversity. In comparison with the White Park, which is similar in population size and adaptation to non-intensive systems of management, the Shetland was ahead on virtually all measures of 'genetic health' ('Breeding the Best' available through Amazon). The White Park is a warning example of the dangers of genetic bottleneck.

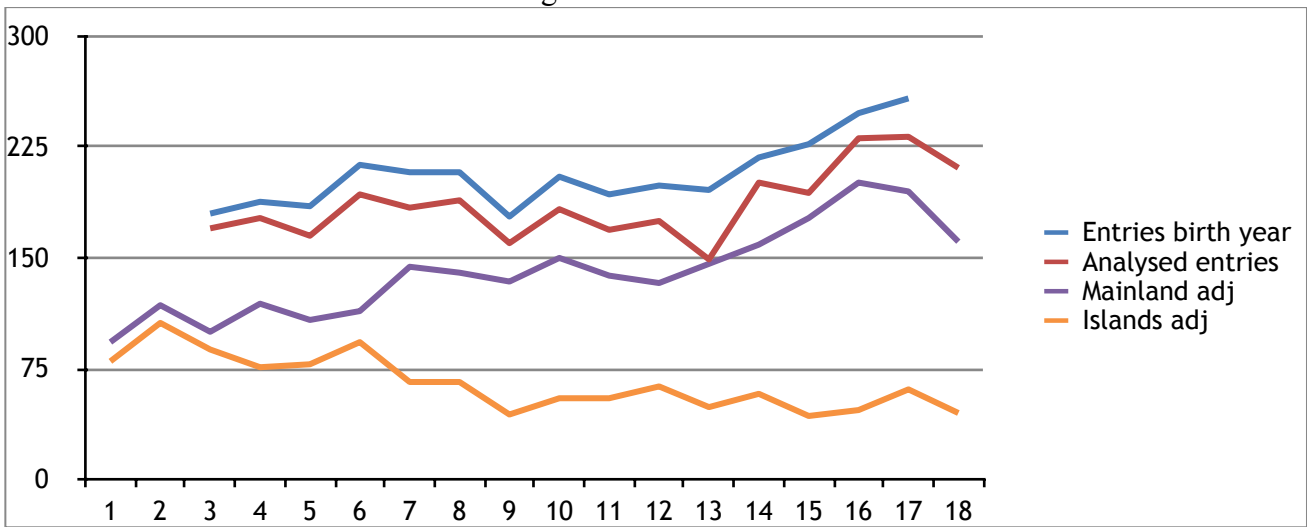
Those welcome evaluations confirm the positive elements of my previous reports, but we still must not lose sight of the threats to the breed. After the two previous reports were published the feedback I received from some members was very helpful, and I am most grateful to them. Feedback is a valuable aid in the preparation of future reports.

Population trends

The 2018 herd book has indicated a possible turning point in the relative fortunes of the breed on the Islands and the Mainland. The allocation of late registrations to the year of birth has been applied again and the adjustments affect the final picture, but the number of registered

2018-born calves on the Mainland has shown a distinct drop while the Islands have further confirmed the stabilisation seen in the previous two or three years. Late registrations occurred mainly in Mainland herds previously, and may have affected current registrations, but a batch of 2017-born registrations from the Islands has made a closer balance. The adjustment for late registrations gives a better perspective of population trends (Figure 1).

Figure 1
Annual registrations of calves



For several years I have used annual calf registrations to determine both the security and status of a breed and the number of breeding cows using a formula of 4 breeding cows per female calf registered. On that basis the breeding herd now numbers about 900 cows.

Genetic analyses

Maintaining diversity and a good balance of breeding lines within the breed are high priorities but they must not be used to excuse the use of poor quality sires. A sensible balance will give the best opportunities to sustain and progress Shetland cattle. I have used this report over the years to give warning of potential (or actual) problems. For several years the threat of a Rasmie/Boris genetic bottleneck was a prominent feature, and currently dominance of Heather genetics gives cause for concern, but the main focus is the identification of bulls that not only help to achieve a good balance between the various lines within the breed but also maintain the quality expected in breeding stock.

The loss (extinction) of a founder line or family is a permanent and irretrievable erosion of diversity within the breed and we must be alert to that danger. Although some families are only intermittently active, all credit is due to breeders of Shetland cattle for the conservation of founder lines and families in the last 17 years. Knocknagael Mary and one or two others keep flitting on the edge, but the successful conservation of founder influence and the ongoing monitoring of the overall founder effect by GCI is a powerful basis for the sustainable viability of the breed.

GCI

Measurement of GCI of Shetland cattle since 2002 (Table 1) shows it has been virtually stable indicating a relatively healthy state. The GCI score has remained fairly steady with a drop of only 2% in the last decade. The greatest loss of founders occurred as a carry-over in a period of uncertainty during the interval between the foundation of the new herd book in 1981 and the commencement of these reports in 2001 and lack of recording earlier.

Table 1

Loss of Founders 1981-2018

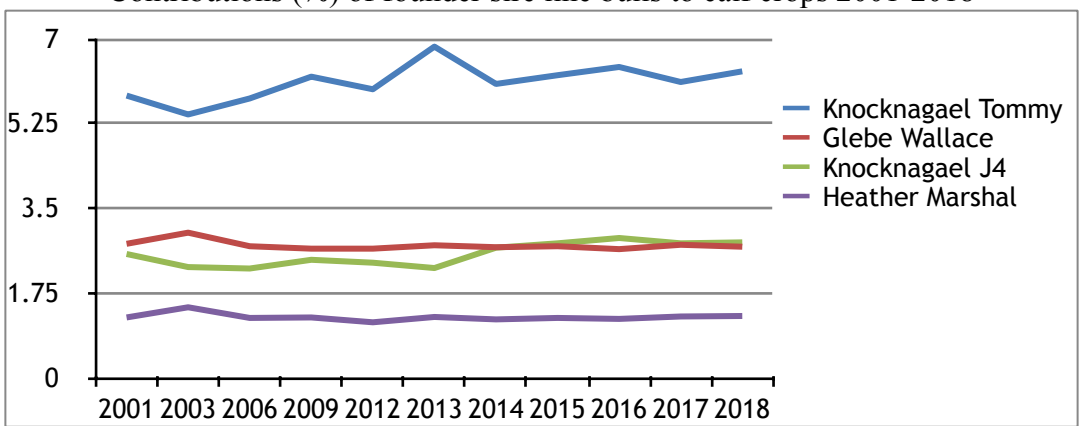
Measure	1981	1999	2002-5	2006-9	2012-5	2016	2017	2018
Active ancestors		798	909	1056	1386	1550	1567	1569
Active male founders*	28	25	25	25	25	24	24	24
Active female founders*	66	53	47	48	48	48	49	49
Total active founders*	94	78	72	73	73	72	73	73
GCI			32.63	31.59	31.57	30.67	31.21	30.96

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

Bull line founders and HB Volume One representatives:

Figure 2

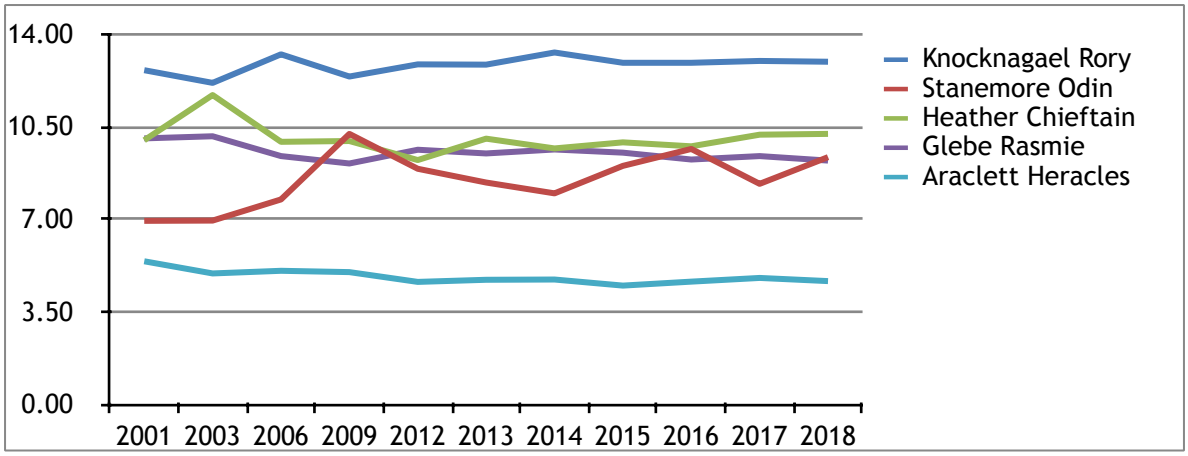
Contributions (%) of founder sire line bulls to calf crops 2001-2018



Knocknagael Tommy continues to have the largest male founder contribution (Fig 2), but the contributions have been very stable for all the founders of existing tail male dynasties.
The pattern of influence of the main representatives of the four sire lines in Volume One (1981) of the Herd Book (Figure 3) is a better indicator of the genetic security of the breed and it also has remained steady, although that is subject to reservations regarding the increase in Heather influence.

Figure 3

Comparative contributions of HB Volume One bulls to 2001-2018 calf crops



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

Rasmie and Boris

The historic threat of the 'colour' genetic bottleneck related to Collafirth Rasmie and Templeson Boris was confined mainly to the Islands, but their influence has declined steadily and now is an issue that requires ongoing monitoring rather than urgent action (Table 2).

Table 2

Changing influence of Collafirth Rasmie and Templeson Boris 2012-2018

Bull	Location	2012	2013	2014	2015	2016	2017	2018	%+/-
Collafirth Rasmie	**Islands**	**8.13**	**7.83**	**6.96**	**5.09**	**6.57**	**7.33**	**6.22**	**- 1.91**
Collafirth Rasmie	**Mainland**	**2.93**	**2.83**	**2.79**	**3.28**	**3.17**	**3.08**	**3.18**	**+ 0.25**
Templeson Boris	**Islands**	**8.28**	**8.76**	**6.56**	**5.39**	**5.24**	**7.05**	**4.20**	**- 4.08**
Templeson Boris	**Mainland**	**3.39**	**2.90**	**2.97**	**3.27**	**3.20**	**3.24**	**2.95**	**- 0.44**

The influence of Boris and Rasmie on the Mainland has been steady and does not merit special attention.

Influence of young bulls on 2017 crop of calves

Mainland

The danger of imbalance as a result of the increasing dominance of Heather genetics has been an increasingly urgent message in these reports. There are some signs that the problem is being recognised and acknowledged, but not sufficient to arrest or reverse the trend. Three young bulls that were making a change, Whinpot Jackdaw, Meadow Heron and Hollington Imperial are believed to be dead. Meanwhile it seems there has been greater use of AI bulls, such as North House Victor and Ocraquoy Haldor, which exacerbate the problem (Table 3). As will be seen elsewhere in the report there is a good choice of bulls which can correct the problem.

Table 3

Contribution of young bulls to 2018 crop of calves on the Mainland

(Bulls marked * now believed dead) (2017 figure in brackets)

Bull	Born	Contribution	Notes
Templeson Victor	2013	2.95 (1.33)	
Meadow Rusty*	2014	2.48 (2.13)	Heavy concentration of Heather
Whinpot Jackdaw*	2016	2.17 (nil)	Good balance of lines
Meadow Heron*	2016	2.17 (nil)	Good balance of lines
Hollington Imperial*	2014	2.02 (1.86)	Son of Trondra Arrow; good balance of lines
North House Victor	2014	1.86 (nil)	Heavy concentration of Heather; AI bull
Tinkers Hill Gentleman	2016	1.55 (nil)	Heavy concentration of Heather
Ocraquoy Haldor	2014	1.55 (nil)	Heavy concentration of Heather and Templeson Boris; AI bull

Islands

In the report last year it was noted that Collafirth Tyson had the potential to help to correct the imbalance in the Islands genetics, but he has not featured in the lists this year. Another Collafirth bull, Odin, has appeared but he is the only one in the list (Table 4) that does not accentuate the Heather genetics imbalance. All the other bulls bring a heavy Heather concentration together with significant elements of Templeson Boris and Collafirth Rasmie.

Table 4

Contribution of young bulls to 2018 crop of calves on the Islands

(Bulls marked * now believed dead) (2017 figure in brackets)

Bull	Born	Contribution	Notes
Collafirth Louis*	2013	18.33 (7.14)	Concentrated Heather and Coll Rasmie influence
Collafirth Odin	2016	10.00 (nil)	Son of Balou
Gillarunna Robbie	2014	5.56 (nil)	High Heather influence
Collafirth Guinness*	2015	4.44 (nil)	High Heather influence
Ocraquoy Haldor	2014	3.89 (7.14)	Concentrated Heather and T Boris influence
Ocraquoy Imperio*	2016	3.33 (nil)	High Heather, Coll Rasmie and T Boris
Geldron Dunder*	2015	2.22 (1.19)	High Heather, very high T Boris
The Point Jacobite	2015	2.22 (15.48)	Concentrated Heather and Coll Rasmie influence
Collafirth Bagheera	2016	2.22 (nil)	High Heather influence; son of Balou

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

Future Policy

Recommended bulls

The breed ‘surveyors’, to whom I am most grateful for their help, provided me with a list of bulls conceived in 2018 by a mixture of AI and natural service, which they believed probably would be kept entire. Those bull calves offer a very positive choice and it must be hoped they are brought on as potential herd sires. Four bulls in England and Wales could significantly reduce the Heather imbalance threat. ‘Imbalance’ may seem a rather nebulous and inconsequential term, but it has the potential to create a ‘genetic bottleneck’ and that is a serious problem.
Little Wyld Davey, **Little Wyld Davidson** and **Newsham Raven** hold particular promise, and **Newsham Robin** is very similar.
Three bulls in Scotland fall into the same mould, especially **Fleecefaulds Hagar** and **Croic Bhein Hobbes** and **Croic Bhein Brocair** to a slightly lesser degree. They all also help to boost the Araclett line.
The use of three bulls born in 2019 demands caution and care as they increase the imbalance problem. Wharncliffe Paddy and Wharncliffe Peter increase the Heather influence and Ocraquoy Lucifer owes too much of his ancestry to Collafirth Rasmie..

I now have details of more than 200 bulls on the lists. Many are dead but still they feed into the information bank which informs decisions and recommendations. I am listing below bulls that are likely to prove beneficial in breeding programmes, and others that are likely to exacerbate problems.

Islands

The report last year voiced real concern as follows: “*Warning flags have been waved during the last two or three years regarding the concentration of breeding in the Islands of Heather genetics, and Glebe genetics to a lesser degree. If the warning (which has been repeated this year) is not heeded there is a real danger of the Islands genetics entering another bottleneck*”. About 35 bulls have been used recently to sire registered calves and 91.4% were from the Heather or Glebe lines. Only 8.6% were from the Araclett line and none from the Knocknagael line.

Collafirth Tyson (2013) and **Collafirth Odin** (2016) are worthy of careful note. Tyson was used in 2016 and 2017 and retention of a good son or sons as a potential herd sire would be desirable. He belongs to the Heather sire line but in good balance with other lines. His dam was 11 years old when he was born. He has Hjem Lowrie, Troswick Beach and Collafirth Jamie close up in his pedigree; he reduces the level of Knocknagael Rory; and Collafirth Rasmie and Templeson Boris are almost absent from his pedigree. Odin is a son of St Trinians Balou and he also brings a good balance of lines while reducing Heather influence.

Scotland

One or two good bulls are no longer with us. Trondra Arrow, St Trinians Hawthorn and Carn Bhren Irish unfortunately are deceased. Irish has gone, but his son Stenscholl Paddy (from the Knocknagael line)) and Carn Bhren Innus (Araclett line) are still working. There is a much better balance between the four lines in Scotland, although both Heather and Glebe still remain rather too dominant, and therefore Araclett and Knocknagael line bulls should have priority.

Stenscholl Paddy (2016), a red and white bull by Carn Bhren Irish out of Broadacres Zoe, is a worthy son of Irish. He will reduce the Heather influence and has negligible levels of Rasmie and Boris. He was lightly used in 2017 and deserves to join quality cows to breed good sons.
Rogiavi Hamelin (2017) brings some older lines into his pedigree. He is by Garths Adonis, one of the early A.I. bulls and therefore belongs to the Araclett line. Rasmie and Boris are absent from his pedigree, and he has very little Heather genetics.
Carn Bhren Inuus (2014) was recommended in the report last year but was only used lightly. He is a brown-brindle son of Balou, out of a daughter of St Trinians Mansie; an impressive pedigree, from which Rasmie and Boris are almost absent.
Carn Bhren Lazarus (2017) is a son of Inuus and thus perpetuates the Araclett sire line. He also has a reasonable balance between the lines.

Bulls which must be used with great care because of their potential to create or exaggerate the imbalance are Cross Reguill Adam, Carn Bhren James and Lhiannag Coinneach (Heather influence) and Glachbeg Casper, Renwick Renoir, Carn Bhren Liam and Fleecefaulds Gregor (Boris/Rasmie influence).

England/Wales

I have a list of more than 90 bulls which may have been used in England and Wales in 2017 and later, plus young bulls not yet in service including those born in 2019. The latter were discussed above, but there is a good selection available. The only danger is the trend towards dominant Heather influence that was given attention in the report last year and is confirmed by the analysis of calves born in 2018. The bulls which are a potential danger were listed above (see Future Policy).

However, there also are an equal number of bulls which can exert a very positive influence and are recommended. Blazefield Rufus has gone but has three sons still in service, Whinpot Red Adair, Wharncliffe Jack and Wharncliffe Kyle. Similarly Welland Down Flodden has gone but his son Wild Meadows Charles remains. I have listed 8 bulls with stronger Knocknagael and/or Araclett genetics which I wish to recommend to you. It may be that some are already dead, while others have not yet been used, but the choice remains wide.

Whinpot Red Adair (2016) is a red bull by Blazefield Rufus out of a Whinpot cow, and was lightly used in 2017.
Wharncliffe Jack (2013) and **Wharncliffe Kyle** (2014) are both red-and-white bulls and have very similar breeding with a good balance of lines which dilutes the Heather influence, and has low levels of Boris and Rasmie.
Lincwold Sonny (2016) is a good bet as he is strong on Knocknagael and Araclett and the influence of Rasmie has been diluted. He was lightly used in 2017
Wild Meadows Charles (2016) is interesting and valuable. His carefully planned breeding is Welland Down both sides, and several lines trace back to J4 (Knocknagael). Heather, Boris and Rasmie all have only a minimal influence.
Broadacres Bruce (2013) is a son of Gillarunna Innes and therefore from the Heather sire line, but Knocknagael and Glebe are the strongest elements in his pedigree. Only lightly used in 2017.

Balnas Archie (2016), another bull out of a Whinpot cow, brings in valuable older genetics while keeping Heather, Boris and Rasmie influence to a very low level.
Sinclair Bay David (2016) has a pedigree almost free of Boris and Rasmie.

Other bulls worth mentioning are **Blazefield Beano** (2013), **Cwrdu Morgan** (2012) and **Drumlough Isaac** (2015).

Australia

The Zetralia herd has been bedevilled by a run of bull calves so that the analysis was based on only 5 animals, but nevertheless the herd deserves a congratulatory comment. Paddy Zakaria's ability to capture the span of Shetland genetics in a small number of animals is amazing. Her herd embodies 66 founders (out of a total of 73 for the whole breed) and almost as many ancestors as the Islands population. Both Templeson Boris and Collafirth Rasmie have been restricted to a small contribution, and the only downside is that Heather genetics are rather too dominant.

A.I. bulls

The evaluation of the A.I. bulls remains as before. A few of the bulls have the potential to improve the balance between lines, but others will intensify the dominance of influences which already are too strong. The combined Heather/Glebe influence in the pedigrees of A.I. bulls is almost twice as high as that of the combined Araclett/Knocknagael lines.

There is a need to prioritise the use of bulls that correct this imbalance:
St Trinians Balou (SCHBS**), St Trinians Mansie** (RBST), **Stanemore Odin** (RBST) and **Trondra Arrow** (SCHBS) should be high on the agenda.

On the other hand, a larger number of bulls such as Hengae Fearsome, Randolph Fergus, Boquhapple Kelvingrove, Ocraquoy Haldor, North House Frosty and North House Victor will exacerbate the problem.

The other aspect of the A.I. stud that should be noted is that five of the bulls have a heavy input (13- 23%) from Collafirth Rasmie and Templeson Boris. Therefore North House Frosty, North House Victor, Ocraquoy Haldor, Renwick Renoir should be used only after careful consideration of their impact on this problem. Renoir in particular owes 17.6% of his ancestry to Collafirth Rasmie.

Summary

There have been very welcome signs that the population on the Islands has stabilized, which is good news after several years of concern. It also seems likely that the breed in general has passed over the summit of the Boris/Rasmie bottleneck, and that founder lines and families continue to be preserved. None appears to have been lost in recent years. In comparison with other rare breeds the Shetland can show positive measures of diversity.
Population growth, which has been a feature the previous five years, appears to have stalled and next year will show whether it is a trend or a blip. There remains some concern regarding the danger of the increasing dominance of Heather genetics. It is a problem that needs to be

addressed, and especially on the Islands where there is a scarcity of bulls available to correct this imbalance of lines and prevent the possibility of a genetic bottleneck.
Nevertheless there is good reason for optimism. There is a reasonable choice of bulls which can maintain a good balance of lines within the breed, and the current genetic diversity offers breeders the opportunity to select wisely and breed prudently and continue the development of the breed with the quality bulls available. They allow the opportunity to maintain a good balance of lines.