

# Considering stillbirths in the breeding program?

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## 1. Introduction

In later years stillbirth rate has increased in Swedish dairy cattle and it has become particularly high in the Swedish Friesian heifers. In the annual statistics of 1996 stillbirth ratio in Swedish Friesian heifers was almost 9%, which of course is unacceptably high (figure 1). This increase is associated with the „holsteinization“ of the Swedish Friesian population.

It also appears to be another type of problem now compared with earlier experiences of calving problems. The stillbirths are not as strongly related to high birth weights and dystocia as earlier. In recent studies of Swedish heifers more than half of the calves that were dead at birth or that died within 24 hours were from normal or easy calvings (Berglund 1996).

Few countries regularly record and evaluate for stillbirths though it should be easy to include the trait as it is easy to register in any integrated AI and milk recording scheme as they include calving date, gestation length, pedigree and information of the calf (if it was alive or dead at birth). Such a registration is nation-wide, cheap and easy to understand.

Stillbirth and dystocia are of large economic importance. It results in loss of calves and maybe also of dams in severe cases. The problems can lead to high costs due to increased labour and veterinarian assistance. It can also result in retained placenta and it may also affect fertility (Philipsson, 1977). The animal welfare aspects are also important to take into consideration when priorities are given to different traits in the breeding goal.

## 2. Causes of stillbirths

Major causes of stillbirths and dystocia and their interrelationships have been reviewed by e.g. Philipsson et al. (1979), and Meijering (1986). The EAAP/EEC working group also recommended definitions to be practised and strategies to reduce problems. This was also discussed at the GIFT workshop in Gembloux (Philipsson, 1996) as well as possible causes behind increasing stillbirth rates (Berglund 1996). Stillbirths are now generally defined as calves born dead or that die within 24 hours after birth, but some countries do not yet follow this recommendation.

Both stillbirths and dystocia have a maternal and a direct component and therefore the bulls should be

evaluated both as service sires and as sires of heifers (or cows). Further, stillbirths in first and later parities should be considered as two different traits. The heifers are still growing and are not fully matured when they are carrying and delivering their first calf. It is shown in an earlier study (Philipsson 1976) that cows on average can manage to deliver calves 10 kg heavier than a heifer is able to do, achieving the same levels of dystocia (figure 2). Therefore it is important to be able to distinguish between bulls that are suitable to heifers or cows as well as considering this fact in genetic evaluations.

## 3. Genetic variation

There are plenty of studies demonstrating that stillbirths show a low heritability, usually 1-5 %. This low value is often misunderstood to mean that the additive genetic variation is low, but that is not the case. Already in the studies by Van Dieten (1963) the large genetic variation within the MRY breed was demonstrated. From the ongoing Swedish studies it is also apparent that stillbirths exhibit a large genetic variation among Holstein heifers. Table 1 shows the phenotypic means of the groups of bulls with the lowest and the highest stillbirth values as sires of usually more than 200 calves at first parity. The range was between 2 and 27% dead calves. Results were also given for the same bulls as maternal grandsires. As the dam effect partly includes the direct genetic effect it is not surprising that the worst group of sires also exhibit worse values as maternal grandsires, but there is a large variation. This is again demonstrated in table 2 that shows the best and worst daughter group results. Also here the range in stillbirth rate at first parity is 2 - 27% among progeny groups of at least 150 heifers.

The Swedish studies aims at investigating genetic causes of stillbirths that are independent of calving difficulties. We have post-mortem examined some stillborn calves and will also try to look at chromosomes and at DNA-level in calves or bulls. Although no clear causes have been found in the Holstein breed, it seems like a new chromosomal translocation has been found in a bull of the SRB-breed that shows an unusually high stillbirth rate (Gustavsson, 1997). The Swedish data, comprising 1.5 million calvings provide the basis for further studies on variance components of and genetic correlations between calving traits in different parities.

**Table 1.** Example of genetic variation in stillbirths at first parity

Sire	Sires of calves			Maternal grandsires		
	No of calvings	Stillbirths %	Dystocia %	No of calvings	Stillbirths %	Dystocia %
39698	295	2.0	4.1	146	7.0	4.5
44630	223	2.2	3.1	144	6.9	4.9
39725	302	2.3	6.0	169	7.1	10.7
83325	245	2.9	3.3	141	4.3	5.0
83301	238	2.9	3.1	145	4.8	6.2
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39765	240	16.7	7.6	119	6.7	6.7
44032	263	16.7	11.4	248	10.9	8.1
39768	265	18.1	16.2	127	13.4	15.0
39859	239	18.4	19.2	139	14.4	15.1
99201	167	22.8	19.8	143	7.7	8.4
44404	126	27.0	13.5	-	-	-

**Table 2.** Example of genetic variation in stillbirth rate among daughter groups at first parity.

Maternal grandsire	No. of calvings	Stillbirths %	Dystocia %
39556	164	1.8	1.8
83266	151	2.6	5.3
39710	1003	2.7	1.9
39999	168	3.0	6.0
83305	164	3.0	1.8
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99272	196	17.3	17.3
39617	221	18.6	8.6
99160	150	18.7	14.7
39506	161	19.3	18.0
44364	180	26.7	21.1

#### 4. Conclusions

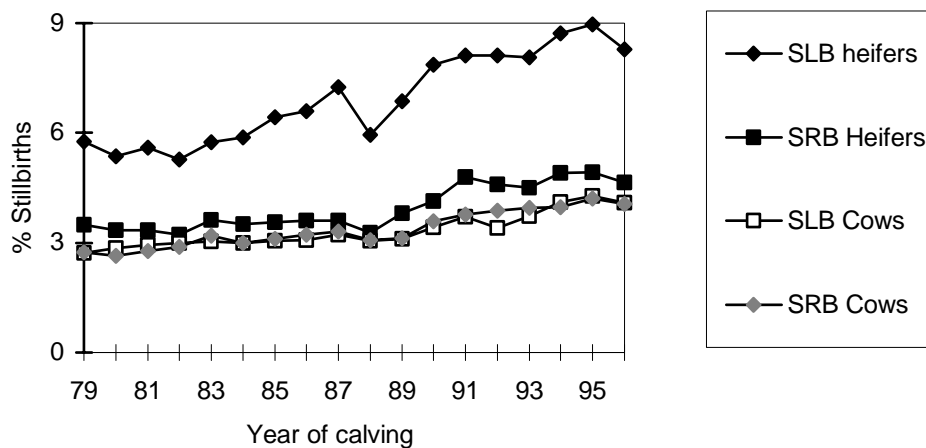
It seems quite important to put emphasis on stillbirths in recording and genetic evaluation for calving traits as a large genetic variation is demonstrated among service sires as well as daughter groups.

More than half of the stillborn calves are usually born at calvings without difficulty. Most bulls that transmit difficult births to their progeny also exhibit high stillbirth rates, while bulls giving easy births may transmit high stillbirth rates.

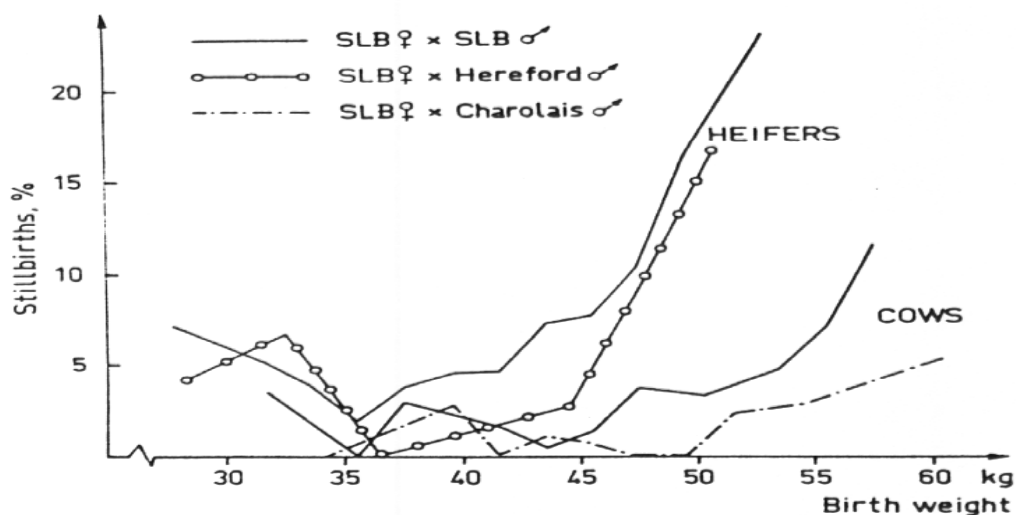
Calvings from heifers vs cows should be regarded as different but correlated traits.

## References

- Berglund, B. 1996. Ongoing research on the causes of variation in calving performance and stillbirths in Swedish dairy cattle. International Workshop on Genetic Improvement of Functional Traits in Cattle. Gembloux (Belgium). 21-23 Jan 1996.
- Gustavsson, I. 1997. Swedish University of Agricultural Science, Dept. Of Animal Breeding and Genetics. Personal communication.
- Meijering, A. 1986. Dystocia in dairy cattle breeding with special attention to sire evaluation for categorical traits. Ph.D.Diss. Wageningen Agric. Univ., Wageningen, The Netherlands.
- Philipsson, J. 1976. Studies on calving difficulty, stillbirth and associated factors in Swedish cattle breeds. V. Effects of calving performance and stillbirth in Swedish Friesian heifers on productivity in subsequent lactation. Acta Agric. Scand. 26, 230-234.
- Philipsson, J. 1977. Studies on calving difficulty, stillbirth and associated factors in Swedish cattle breeds. VI. Effects of crossbreeding. Acta Agric. Scand. 27, 58-64.
- Philipsson, J., Foulley, J.L., Lederer, J., Liboriussen, T. & Osinga, A. 1979. Sire evaluation standards and breeding strategies for limiting dystocia and stillbirth. Livest. Prod. Sci. 6, 111-127.
- Philipsson, J. 1996. Strategies to reduce problems in calving performance and stillbirths by selection and differential use of bulls. International Workshop on Genetic Improvement of Functional Traits in Cattle. Gembloux (Belgium). 21-23 Jan 1996.
- SHS 1996. rsstatistik SHS 1994/95. (Annual statistics from the Swedish Association for Livestock Breeding and Production). SHS, S-631 84 Eskilstuna, Sweden.
- Van Dieten, S.W.J. 1963. Mortaliteit van Kalveren bij de Partus a Terme van M.R.IJ.-Runderen. Diss. Faculteit des Diergeneeskund. Rijksuniversitet, Utrecht.



**Figure 1.** Stillbirth rates 1979-1996. Breed averages for Swedish Friesian (SLB) and Swedish Red and White breed (SRB) (Annual statistics from SHS).



**Figure 2.** Relation between percent stillbirths and birth weight of calf for cows and heifers of various breed combinations.