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A comparison of the reproductive performance of Holstein-Friesian and Norwegian Red dairy cattle on commercial dairy farms over five lactations

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Introduction Fertility traits have been included within breed selection programmes for the Norwegian Red (NR) dairy cow population in Norway for over thirty years. As a consequence, a 60 day non-return rate to first artificial insemination (AI) of 72.5% was recently calculated for NR cows in Norway (Garmo *et al*., 2008). In view of this long term breeding programme, and current fertility performance within Norway, there is considerable interest in the NR breed as a means of overcoming the high levels of infertility that currently exist within the Holstein-Friesian (HF) breed. However, farming systems within Norway are very different from those within the UK, with herd sizes in particular being much smaller. Thus an experiment was established on 19 commercial dairy farms to compare the fertility performance of cows of the NR and HF breeds.

Material and methods Two hundred and twenty one Norwegian dairy cattle were imported into Northern Ireland as maiden heifers (3 – 15 months old), and placed on 19 commercial dairy farms (11 or 12 animals/farm). An equal number of 'home bred' Holstein-Friesian (HF) animals of similar ages were selected on each farm. More than 25 sires were represented within each breed. On each individual farm, animals of both breeds were subject to the same rearing and management regimes pre-calving, and to the same feeding regimes during lactation 1. During successive lactations, farmers managed individual cows as they believed to be appropriate. The 19 participating farms were selected to cover a range of production systems, and represented both Spring and Autumn calving herds. Throughout the study, animals were bred by both artificial insemination and by stock bulls, with breeding policy varying from farm to farm. A total of 46, 130, 96, 54 and 30 HF cows were inseminated by AI as heifers, and in lactations 1, 2, 3 and 4 respectively. The equivalent figures for the NR cows were 54, 154, 107, 71 and 45, respectively. Conception rates to 1st AI were calculated based on a subsequent calving. With the Holstein breed, 197, 157, 117, 88, 57 and 35 cows calved into lactations 1 – 6 respectively, while with the NR breed, the numbers were 208, 184, 144, 112, 78 and 59 respectively. Calving intervals were calculated for cows which calved into lactations 2 to 6. The proportion of cows culled as infertile between the start of the experiment and the start of lactation 6 was calculated. Binomial data (conception to 1st AI and proportion of cows culled) were analysed by binomial regression analysis, with breed differences compared using a t test. The effect of breed on calving interval was compared using REML analysis. In both cases, the analysis took account of farm effects.

Results Conception to 1st AI was significantly higher with the NR breed than with the HF breed in lactations 1 ($P<0.05$), 2 ($P<0.01$) and 3 ($P<0.001$), while not being affected by breed in maiden heifers and in lactation 4 ($P>0.05$). Calving interval was significantly lower with cows of the NR breed in lactation 3 ($P<0.05$), but not affected by breed in any other lactation ($P>0.05$). Of cows culled during the experiment (excluding cows culled for statutory reasons (Tuberculosis and Brucellosis) and due to farmers leaving the study), a significantly greater proportion of HF cows were culled due to infertility, compared to NR cows ($P<0.01$).

Table 1 Fertility performance of Holstein-Friesian (HF) and Norwegian Red (NR) dairy cows on 19 commercial dairy farms

	HF	NR	SEM	Sig
Conception to 1st AI (proportion)				
Maiden heifers	0.58	0.66	0.065	NS
Lactation 1	0.41	0.55	0.040	*
Lactation 2	0.39	0.60	0.047	**
Lactation 3	0.35	0.65	0.058	***
Lactation 4	0.52	0.59	0.082	NS
Calving interval (days)				
Lactation 1	389	399	4.6	NS
Lactation 2	390	379	5.0	NS
Lactation 3	397	376	6.2	*
Lactation 4	387	384	7.1	NS
Lactation 5	399	386	8.3	NS
Proportion of cows culled during study ‡	0.76	0.71	0.025	NS
Of cows culled ‡, proportion culled due to infertility	0.42	0.25	0.039	**

‡Excludes cows culled for statutory reasons (Tuberculosis and Brucellosis) and due to farmers leaving the study

Conclusions Reproductive performance of NR dairy cows was significantly better than HF cows when managed under typical commercial farm conditions in Northern Ireland

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Reference

Garmo, R.T., Refsdal, A.O., Karlberg, K., Ropstad, E., Waldmann, A., Beckers, J.F. and Reksen, O. (2008). Journal of Dairy Science, 91: 3025 – 3033.