Cross-breeding provides heterosis in offspring

IN stark contrast to Mike Osmundson and his clutch of dairy farmers in California, university professor Les Hansen is still a passionate fan of the Holstein cow.

He said the breed was not without its flaws (see “The problem with the Holstein”), and in-breeding was a huge problem, but the Holstein cow was still the best dairy animal in terms of production,udder quality, low udder scores and temperament.

Yet he did not believe commercial dairy farmers should be milking her - and that was because overriding his love for the Holstein breed was a fascination with heterosis.

Heterosis (or hybrid vigour) was the science behind what genetic improvement could be made in California – the reason why the cross-bred cows were performing so well.

Prof Hansen said crossing breeds with each other would always produce heterosis, so the resulting cross would always outperform its parents.

That enhanced performance would be in terms of much better fertility, health, mortality and milk quality as well as a slight improvement in milk yield.

Crossing would never damage the Holstein breed and, in fact, it was in everyone’s interest for the Holstein cow to keep improving, as the ‘gift of heterosis’ was much greater for those crossing her.

Prof Hansen outlined a future where a handful of pedigree breeders would stop breeding the Holstein as far as they could, while commercial farmers would continue to cross with her and enjoy even better results. “The better the Holstein breed, the better the heterosis will be on top of that for the cross-breeds,” he said.

The trick was to maintain heterosis, and that was impossible with a two-way cross. Prof Hansen said the first cross (F1) would give 100 per cent heterosis, but if the F2 was a cross with one of the original breeds, then heterosis would instantly half.

If the F2 was a cross with a third breed, then heterosis would only reduce by a fraction and would then be sustained at a high level for as long as that three-way cycle of breeds was followed.

A four-way cross would maintain heterosis at an even higher level, but the science relied on each breed being completely different as a baseline for the Jersey, which had initially been used in its cross-breeding project “We like the Holstein and we really like the Montbeliarde for cross-breeding,” said Prof Hansen.

He said working with the Holstein, Montbeliarde and Swedish Red, as the Californian farmers were doing, worked well because the three breeds shared different ancestry.

That was why he and his research team were mimicking the cross with the university dairy herd, ending its involvement with the Jersey, which had been used in its cross-breeding project

“The future for commercial breeders the world over is probably cross-breeding. We still need pure Holsteins, but 95 per cent of cows in the USA are just cows, just kept for milk production, so who cares if they are cross-bred? It’s pretty clear that’s the way to go.”

Any questions or comments on cross-breeding in the USA? Visit www.farmersguardian.com/livestock

The problem with the Holstein

IN Les Hansen’s opinion, the problems associated with the Holstein breed were not so much to do with the push for increased yields, but the desire for size and sharpness.

While production had a negative correlation with health and longevity, he said, size and sharpness did too, and brought disadvantages such as more calving problems, and did not provide any extra milk.

He said the people showing pedigreed Holsteins had a lot to answer for:

“Everyone in the Holstein breed says they want longevity and better health and better fertility, but they are leaving it to someone else while they can breed show cows,” he said.

Prof Hansen said he was working within Holstein US, not against the organisation, to ‘provide a wake-up call’ and move towards ‘rounder, shorter’ cows. “I’m looking forward to the World Dairy Expo sometime in the future when the judge says ‘the first cow over the second cow because she’s smaller and rounder’.”

Crops gain body condition ‘for free’

HAVING started out trialling three-way crosses with Holstein, Montbeliarde and Jersey breeds, the University of Minnesota has dropped the Jersey and recently, introduced the Swedish Red.

This, linked with the fact the first cross-bred cows did not enter the milking herd until 2003, makes analysing the data very difficult, as it is too early to start comparing the different crosses.

However, research student Amy Hazel has made some interesting discoveries about body condition and the ability for cows to get in calf.

Comparing pure Holsteins, Montbeliarde and cross Jersey, cross Holstein (F2), she said both the F1s and F2s had more body condition than the pure Holstein - even though dry matter intake was the same for all three groups. The extra body condition was ‘free’ and, according to the data, did not cause any calving difficulties or get metabolised by the liver after calving (a common problem in Holsteins).

The cows with extra body condition got back in calf much sooner - F1s 60 days and the F2s 47 days earlier - a marked difference and huge economic advantage, according to Miss Hazel.

She said they hoped to understand more about this by looking at early embryonic death and the uterine environment, but this would require more time, more cows and more money.

In addition, there had been a large chunk by Coopex Montbeliarde, so the next stage was to collect data from 10 large herds in Minnesota using Holstein, Montbeliarde and Swedish Red crosses.

The climate alone makes the University of Minnesota a very different place to California, yet they are using the same cross within herd - a cross that could work all over the world.

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