

Moorepark focus

Next Generation Herd shows benefits of crossbreeding

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A huge amount of research has been conducted at Teagasc Moorepark, and internationally, evaluating the performance benefits from crossbreeding in the dairy herd. The results consistently demonstrate that high EBI crossbred dairy cattle outperform high-EBI purebred contemporaries, both within research studies and on commercial dairy farms.

The economic advantage is €100 to €150/cow per lactation in addition to that explained by EBI. This is a consequence of better fertility and longevity, as well as greater herd productivity compared with the average performance of the purebred parents.

The Jersey breed offers particular advantages for crossbreeding in Ireland due to many favourable characteristics: small size, moderate yield coupled with very high milk fat and protein content, high intake capacity, superior feed efficiency and compatibility with a pasture-based system.

These characteristics complement the higher-yielding Holstein Friesian breed. The genetic distance between the Holstein Friesian and Jersey results in a greater expression of hybrid vigour, compared with crosses of more closely related breeds.

Crossbreeding research at Moorepark

From 2006 to 2010, a study including Jersey, Holstein Friesian and Jersey Holstein Friesian crossbred cows identified clear benefits from crossbreeding. The proportion of cows pregnant to first service (+21%), in-calf after six weeks breeding (+19%) and in-calf after 13 weeks breeding (+8%) was considerably higher for the Jersey × Holstein-Friesian compared with Holstein-Friesian (and pure Jersey cows).

The economic analyses [incorporating differences in cull cow and male

calf value] showed that a herd of Jersey × Holstein-Friesian cows was 48% more profitable than a herd of either of the parent breeds. On a per-cow basis, the improved profit equated to over €180/cow per lactation.

More recently (2013 to 2016), crossbred cows have been incorporated into a comparative stocking rate study at Teagasc's Curtin's Research Farm. The EBI value of both the Holstein Friesian and crossbred cows was similar at approximately €130 (ICBF, May 2017).

The Jersey crossbred cows delivered an additional 70kg/ha annually. Economic analysis has not been completed but it is clear that there is a definite advantage in favour of the Jersey crossbred cows exists.

At Teagasc Clonakilty Agricultural College, the research being conducted is primarily concerned with evaluating the benefits of incorporating clover in the grazing sward but does include a comparison between Jersey × Holstein-Friesian and straight Holstein Friesians.

The EBI of both groups of cows is similar (€120 and €105). The Jersey crossbred cows are delivering more milk solids per cow per lactation (466kg v 455kg). They are 10% lighter (-51kg), had 15 percentage units higher pregnancy rate to first service, and five percentage units higher six-week in-calf rate. An economic analysis has indicated a €100/ha advantage to the Jersey crossbred cows.

Our most recent research, an analysis of 40 commercial dairy herds with data from 2010 to 2012, represents

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the first evaluation of crossbred and straight bred cattle within commercial high EBI dairy herds.

The results are in line with the research findings from Teagasc research herds: high EBI Jersey × Holstein Friesian cows produced 25kg more milk solids per cow per year than the mean of high EBI purebred Holstein Friesian and Jersey purebred equivalents. The crossbred cattle also achieved a 7.5-day shorter calving interval within these herds.

A similar piece of research conducted during development of the "culling" or "cow" index found that crossbred cows had a nine-day shorter calving interval, a 6% greater pregnancy rate in the first six weeks of the breeding season and a 3% greater survival rate to





Pictured are cows in the Next Generation dairy herd.

the next lactation. Lifetime financial heterosis was estimated to be just under €550.

Jersey intake capacity

Jersey cows consume approximately 4% of their bodyweight in grass DM daily compared with 3.4% for the Holstein Friesian and 3.65% for the Jersey crossbred cows.

The implication of this is that Jersey and Jersey crossbred cows tend to produce higher yields of milk solids relative to their body weight. This facilitates the higher productivity per hectare achieved with the Jersey and Jersey crossbred cows in the studies outlined above.

Detailed anatomical investigations conducted on animals post-slaughter revealed the physiological mechanisms underpinning the differences in intake capacity observed, which tended to be more physical than metabolic in nature.

Next Generation Herd

In Ireland, the Holstein Friesian breeding programme continues to increase the rate of genetic gain (increasing EBI) due to our national

Key messages

- Crossbreeding with Jersey has the potential to markedly increase milk solids output and herd productivity on Irish dairy farms.
- A Nucleus Jersey herd of elite Jersey genetics has been established at Teagasc Moorepark to evaluate/validate 'high EBI' Jersey genetics. This herd will also generate a supply of high EBI Jersey sires for the Irish dairy industry.

breeding programme and the application of genomic technology. The rate of gain in Jersey genetics is lower, raising questions about the relevance of crossbreeding in Ireland.

A nucleus Jersey herd of elite Jersey cows has been established at Moorepark. This initiative has been driven by:

- The opportunity to exploit the Jersey breed, and its proven synergy with our intensive, seasonal, pasture-based production and dairy product portfolio.

- The extra performance and profit to be gained from capitalising on hybrid vigour in addition to genetic improvement via EBI.
- The absence of an Irish Jersey breeding programme, and consequent reliance on imported Jersey genetics.
- The long-term requirement to continually evaluate high-EBI Jersey genetics in Ireland.
- The requirement to generate high-EBI Jersey sires to complement our successful "black and white" selection programme.

The herd has been established with genetics sourced from different breeding programmes around the world (primarily New Zealand and Denmark). The herd comprises 100 lactating cows, and there are plans to expand the resource.

Ultimately, the success of this initiative will depend on the level of demand for Jersey genetics at commercial farm level. Irish dairy farmers must be willing to embrace the programme by progeny testing the best young test sires that will emerge. This is a vital step to further advance genetic progress within crossbred dairy herds.