

Crossbreeding Studies – Update From Moorepark

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I firmly believe that crossbreeding in the dairy herd can be a valuable tool if used judiciously. Here I outline two exciting new studies that have been initiated at Moorepark to evaluate the merits of two breeds I believe could have a lot to offer Irish dairy farms who are considering crossbreeding this spring.

Whether crossbreeding or not, the choice of AI sires this spring will have a significant influence on the profitability of the dairy enterprise in future years. Farming systems need to be sustainable into the future in terms of the environment, animal welfare, and be farmer friendly. Pressure is on to reduce costs. The cow required under this type of scenario must be robust and 'easy care' as well as being capable of producing high milk solids, the majority of which must come from grazed grass. Optimal financial performance requires a 365-day calving interval and an empty rate after a defined breeding season (failure to conceive culling rate) of less than 10%. Over the coming weeks, before the start of breeding, great effort should be placed on sire selection.

Judicious crossbreeding strategies i.e. crossing the Holstein-Friesian with an alternative dairy breed selected for characteristics that can compliment it, can provide farmers with an alternative opportunity to increase herd health and fertility, and in so doing dramatically improve herd profitability. This fundamentally is achieved through the introduction of favourable genes from another breed selected more strongly for traits of interest, by removing inbreeding depression, or through heterosis/hybrid vigour. Heterosis/hybrid vigour means that crossbred animals usually perform better than that expected based on the average of their parents.

New Zealand is probably the best example of where crossbreeding is used to a large extent to capitalise on the benefits of hybrid vigour. There, the Black and White and Jersey breeds in many respects are very similar, having been selected through a common index for many years. In their scenario, the added performance obtained through heterosis is seen as a prudent means of achieving higher profitability. In New Zealand heterosis values of 5-6% are observed for production traits and values of up to 18% for reproduction and health traits are observed. Put simply, in New Zealand 20% more crossbred cows survive to

5th lactation compared to Holstein-Friesians.

Heterosis will generally be higher in traits related to fitness and health, i.e. traits which have lower heritabilities. The main reason for crossbreeding, in an Irish context, somewhat different to that in New Zealand, should be to avail of positive characteristics in an alternative breed that are weak in your current herd. For most at present this is likely to be reduced survival. Heterosis is an important consideration, but true genetic gain must not be neglected, i.e. only use the best sires in both breeds. Here that means high EBI. [Editor's note: EBI stands for Economic Breeding Index, a selection tool in Ireland that is derived from measures of longevity, fertility (calving interval) and milk, fat, and protein yield.] An across-breed evaluation is not quite up and running in Ireland yet but preliminary EBI values estimated by ICBF for a number of alternative breed AI sires suggests that many high EBI sires do exist within the more popular alternative breeds available. In the mean time, using appropriate progeny tested AI bulls, with high breeding values for traits deemed important here, will be an important component of a well-planned crossbreeding program. Breeds that don't have good progeny testing programs will be limited in how effectively they can contribute to a crossbreeding program.

Jerseys added to the fray at Ballydague

Interest in the Jersey has taken off in Ireland over the last three or four years. Estimates suggest between 20 and 30,000 doses of Jersey semen have been purchased over this time. While cull cow and calf prices are high, the Jersey is undoubtedly at some disadvantage. However, with increasing uncertainty in this area, many discerning Irish dairy farmers are turning to Jersey (Jersey cross) as their cow of the future. For many the initial move is on their Holstein maiden heifers. The ease of calving associated with Jersey is a much appreciated characteristic. The Jersey of course is the second most popular breed in the world and the interest here is likely being fueled by the breed's popularity in New Zealand. There, crossbreeding with the Jersey is considered to leave the most profit, generated from high solids production at high stocking rates. Currently the National herd in New Zealand consists of 18% pure Jersey and 25% Jersey x Holstein-Friesian. It is anticipated that the Jersey influence is expected to increase with time.

At the Moorepark 'Ballydague' research farm, this spring 30 purebred and 30 crossbred Jersey heif-

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ers have been added to the line-up. The heifers are by high EBI sires from both New Zealand and Denmark. The strong performance of many Jersey sires in the recent ICBF across-breed evaluations suggests that the breeding values (of the crossbred heifers at least) will make them one of the highest EBI herds at Moorepark. As well as production, energy balance, fertility and health characteristics such as mastitis incidence, the research is keen to evaluate the reputed superior feed efficiency of the Jersey breed and what a crossbreeding strategy involving the breed might offer Irish dairy farmers. The superior feed conversion efficiency of the pure Jersey has been estimated previously to be about 6% greater than the Holstein across a range of feeding systems. However, most of the historic studies were short term rather than 'full production cycle' studies as will be the case here.

The heifers who began calving in early February are already showing impressive potential, recording yields of up to 23 kg/day, and that is for the pure Jersey as well as the Jersey crossbreds. The Jersey and Jersey crossbred heifers will perform alongside Holstein-Friesian, Norwegian Red and Montbeliarde heifers making for a very interesting study!

Norwegian Red trial now underway!

The study which started in June 2004 with the importation of almost 400 purebred Norwegian Red heifer calves has now begun in earnest. The animals which are spread across 50 participating dairy farms have begun to calve. These heifers along with a similar number of crossbreds (Holstein-Friesian x Norwegian Red) and Holstein-Friesians form part of a very important study aimed at providing accurate breeding values for the Norwegian Red breed through the ICBF across-breed evaluation system. Since 1971, fertility and mastitis incidence have been included in the breeding program of Norwegian Red breed. The relative weighting for the traits in their index currently stands at 15% for fertility and 22% for mastitis resistance. The weight on protein yield (only milk trait selected) stands at 23%. This relatively low level on milk production is thought by Norwegian geneticists to be critical in getting the balance right. Progeny testing for fertility and health traits is based on over 200 daughters per sire.

The Norwegian Red cows on trial at Ballydague since 2001 have performed very well to date. The reputed characteristics of the breed; ease of calving, high female fertility and low SCC/mastitis incidence have been observed with the small numbers at Bally-

dague. Now, these characteristics are being keenly awaited at farm level. The study is expected to run for at least three years so at this stage it is to wait and see. Early reports however, from the participating farms indicate that the purebred Norwegian heifers in general are calving extremely easily. The outcome of the study will allow Irish dairy farmers a greater variety of top sires to select from within the EBI and of course provide EBIs for crossbred Norwegian Red cows.

Cyclicity prior to breeding in maiden heifers

Maiden heifers account for 20 to 30% of animals that will be bred this breeding season. As a group they are likely to represent the highest genetic material in the herd. They also have the potential to significantly improve slippages in calving pattern. However, to deliver greatest benefit they must conceive early in the breeding season. So logically, first and foremost they must be cycling at the beginning of the breeding season.

Contributing to the large on-farm Norwegian Red study are a total of almost 1700 dairy heifers. Measurements carried out to date include live weight and body condition score at different stages, and an ultrasound scan carried out prior to breeding season. The purpose of this scan was to determine the proportion of maiden heifers cycling on each farm prior to the intended start of breeding date. As well as providing information that would indicate if differences exist between the Holstein and the Norwegian Red regarding rate of maturity, these heifers also provide a valuable data set from which information that may be of potential benefit to future heifer management may be obtained. In order of importance, body condition score, body weight, age and breed, were all observed to influence the likelihood of maiden heifers having cycled at least one prior to the start of the breeding season. Preliminary analysis highlighted the importance of having well grown, well conditioned heifers. Except for very young heifers (under 14 months) age was not of major stumbling block to getting heifers cycling. At condition scores of 3.25 or over, the data indicated that one can expect to have 85 to 90% of heifers cycling prior to the start of breeding. However, at scores of 3.00, or 2.75 or less cyclicity rates of around 65% and 51%, respectively can be expected. In terms of target weights, heifers weighing 320kg and over had cyclicity rates in the region of 85%, compared to under 50% for heifers weighing 290kg or less. Details on conception rates are not yet analysed. ♦