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## Beef from Holstein-Friesian, Norwegian Red x Holstein-Friesian and Jersey x Holstein Friesian male cattle



### Key external stakeholders:

Irish beef and dairy farmers, Teagasc Advisory, Meat processors, ICBF, An Bord Bia

### Practical implications for stakeholders:

- It is concluded that crossbreeding in the dairy herd with Norwegian Red sires had no negative effects on the beef merit of the male progeny compared with pure Holstein-Friesian but crossbreeding with Jersey sires reduced carcass weight and value per kg of carcass.
- In terms of slaughter weight per day of age, Jerseys were poorest, while Norwegian Red and Holstein-Friesian were broadly similar.
- Carcass weights were broadly similar for the Holstein-Friesian and Norwegian Red progeny, which were 32-35 kg heavier than the carcasses produced by Jersey sired crossbred animals.
- Kill-out proportions were similar for Norwegian Red and Holstein-Friesian progeny which were in turn higher (10 g/kg) than Jersey offspring.
- Jersey sired progeny were leaner and had poorer conformation.
- Feed intake was similar for the breed types, but intake per kg mean live weight was higher for Jersey crossbred animals.

### Main results:

Male animals from both Norwegian and Holstein-Friesian sires had similar beef characteristics when slaughtered at ~2-years of age. These sires produced carcasses which were ~30 kg heavier than animals sired by Jersey sires. Absolute intake was similar between the crosses, but when expressed relative to body weight, Jersey sired animal had the highest feed intakes.

### Opportunity / Benefit:

The data is directly relevant to producers who are involved in dairy-beef systems. The data shown the comparability of beef from both Norwegian Red and Holstein-Friesian breeds and demonstrates the inferior beef merits of Jersey sired animals.

### Collaborating Institutions:

University College Dublin

**Teagasc project team:** Dr M.G. Keane (PI)  
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### 1. Project background:

Crossbreeding in general offers the potential for improved economic efficiency through the introduction of favourable genes from another breed that has been selected for the relevant traits (breed complementarity), through avoidance of the negative effects of inbreeding, and capitalising on the expression heterosis as hybrid vigour. Crossbreeding can be particularly important in the improvement of traits with low heritability such as fertility and health. The crossbreeding that is taking place in dairy herds will result in the male crossbred calves entering the beef industry. Therefore, their beef production potential needs to be evaluated. This study aimed to evaluate the beef merits of male progeny emerging from the dairy herd as a result of crossbreeding that is taking place in that herd.

### 2. Questions addressed by the project:

The use of Jersey sires is gaining interest in the dairy sector and there is a similar interest in the use of Norwegian Reds. As crossbreed beef is common from the dairy herd, this study was undertaken to: (1) to compare Holstein-Friesian (HF), Norwegian Red x Holstein-Friesian (NR) and Jersey x Holstein-Friesian (JE) male cattle for beef production, (2) to compare these breeds reared as bulls or steers to two slaughter weights, and (3) to elaborate interactions of breeds type, gender and slaughter weight.

### 3. The experimental studies:

- This study compared the production and carcass traits for Holstein-Friesian (HF), Norwegian Red x Holstein-Friesian (NR) and Jersey x Holstein-Friesian (JE) male cattle. A total of 120 spring-born male calves were reared to slaughter in a 3 breed types (HF, NR and JE) x two genders (bulls and steers) x 2 slaughter weights (Light, 570 kg and Heavy, 640 kg) study.
- Calves were reared in a standard dairy calf-to-beef system (bucket reared, calves to pasture for first grazing season, steers castrated in September, all animals housed for the first winter in October and offered grass silage *ad libitum* plus 1.5 kg/day concentrates, returned to pasture in April for their second grazing season). The bulls were then housed in August (17-month old) and the steers were housed in November (19-months old).
- Both genders were finished on a total mixed ration of proportionately 0.67 concentrates and 0.33 silage.

### 4. Main results:

- Slaughter weights per day of age were 836, 828 and 761 g for HF, NR and JE, respectively.
- Corresponding carcass weights and kill-out proportions were 314, 309 and 277 kg, and 495, 499 and 485 g/kg respectively.
- Carcass conformation class (15 – point scale) and carcass fat class (15 – point scale) for the three genotypes were 4.7, 5.3 and 4.0, and 8.5, 8.6 and 7.7, respectively.
- Feed intake was similar for the breed types, but when expressed as intake per kg mean live weight it was higher for JE.
- Slaughter weight per day of age was greater for bulls than steers and for Heavy than Light slaughter weight.
- Bulls had higher kill-out proportions, better carcass conformation, greater *m. longissimus* area and a greater proportion of ribs joint muscle, and a lower proportion of fat than steers.
- It is concluded that crossbreeding with Norwegian Red had no negative effects on the beef merit of the male progeny compared with pure Holstein Friesian but crossbreeding with Jersey reduced carcass weight and value per kg.

### 5. Opportunity/Benefit:

While on-going the grazing study was used for frequent outdoor in-service training sessions organised through Teagasc. In addition the data generated, both grassland and animals data, were frequently used at in-service training days at Grange. During the course of the study many visitors to Grange were exposed to the study and the data generated by the study.

### 6. Dissemination:

#### Main publications:

McNamee, A., Keane, M.G., Kenny, D. A., Moloney, A. P., Buckley, F. and O’Riordan, E. G. (2014) ‘Beef production from Holstein–Friesian, Norwegian Red x Holstein–Friesian and Jersey x Holstein Friesian male cattle reared as bulls or steers’ *Livestock Science (accepted)*

McNamee, A., Keane, M. G., D.A. Kenny, D. A., Moloney, A. P., O’Riordan, E. G., Dunne, P.G. and Moloney, A. P. (2014) ‘Colour of subcutaneous adipose tissue and colour and tenderness of *M. longissimus dorsi* from Holstein–Friesian, Norwegian Red x Holstein–Friesian and Jersey x Holstein Friesian cattle at two live weights as bulls or steers’ *Agricultural and Food Science (accepted)*

McNamee, A., Keane, M.G., McGee, M., Kenny, D.A. and O’Riordan, E.G. (2011) ‘Intake of Holstein-Friesian, Norwegian Red x Holstein-Friesian and Jersey x Holstein-Friesian males reared as steers or bulls’ In: *Proceedings of the Agricultural Research Forum*, Tullamore, 14<sup>th</sup> March, p101.

O’Riordan, E.G., McNamee, A., Keane, M.G., Buckley, F. and McGee, M. (2011) ‘Performance and carcass traits of Holstein-Friesian, Jersey x Holstein-Friesian and Norwegian Red x Holstein-Friesian steers; effect of turnout date and post-grazing sward height’ In: *Proceedings of the Agricultural Research Forum*, Tullamore, 14<sup>th</sup> March, p106.

McNamee, A., Keane, M.G., O’Riordan, E.G., Kenny, D.A., Dunne, P. and Moloney, A.P. (2012) ‘Fat colour and the colour and tenderness of muscle from Holstein-Friesian, Norwegian Red x Holstein-Friesian or Jersey x Holstein-Friesian cattle raised as bulls or steers’ In: *Proceedings of the Agricultural Research Forum*, Tullamore, 12<sup>th</sup> March, p40.

### 7. Compiled by: Edward O’Riordan