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Benchmarking technical and economic performance of beef cow-calf to finishing production systems in Ireland

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ABSTRACT

The objectives of this study were, for cow-calf to finishing production systems, to benchmark animal and financial performance of Irish "national average" farms (AVE) and farms participating in a farm improvement program (IMP) with experimental research farm systems finishing male progeny as steers (RES-S) or bulls (RES-B), and to identify key technical characteristics and financial drivers within these 3 farm categories. Stocking rate, BW output per livestock unit, and carcass weight per day were less on AVE and IMP compared with RES-S/RES-B. Age at first calving was 31.5, 28.9, and 24.0 mo on AVE, IMP, and RES-S/RES-B, respectively. Calving rate and weaning rate were less on AVE than on IMP, and these rates were less on IMP than on RES-S/RES-B. Gross output value and costs per hectare were least on AVE and greatest on RES-S/RES-B. Feed-related costs accounted for 36, 50, 47, and 58% of total costs per hectare on AVE, IMP, RES-S, and RES-B, respectively. Fixed costs accounted for the largest proportion of AVE total costs. Costs of production per kilogram of beef BW equated to $4.73 (€4.04), $2.26 (€1.93), $1.78 (€1.52), and $2.04 (€1.74) on AVE, IMP, RES-S, and RES-B, respectively. A negative net profit per hectare of −$897 (−€767) was achieved by AVE; IMP, RES-S, and RES-B attained net profits per hectare of $208 (€178), $587 (€502), and $405 (€346), respectively. Key performance indicators underpinning profitable beef cow-calf to finishing systems include high individual animal performance (cow reproduction and progeny growth), optimal stocking rates, and low fixed and purchased feed costs.

Key words: calf-to-beef system, cow-calf herd, reproduction, profitability, financial efficiency

INTRODUCTION

Although beef prices reached record high levels in the last decade (Behrendt and Weeks, 2017), few countries reported positive levels of profitability on cattle farms without the aid of government support payments (Deblitz et al., 2016). Irish beef cow-calf farms are, on average, loss making without the aid of EU support payments and off-farm income (Hennessy and Moran, 2016); however, there is large variation in profitability. For example, among a sample of farms in Ireland, the top third achieved a net profit per hectare in 2015 that was 3 times greater than the average of those farms (Teagasc, 2017b).

In temperate climates, such as Ireland, beef production systems are predominantly pasture based because grazed grass is the cheapest feedstuff available (Finneran et al., 2010). Consequently, these production systems are designed to optimize the seasonal supply of pasture, with a key objective being to maximize the proportion of total lifetime animal weight gain from grazed pasture (Crosson et al., 2009a,b; McGee et al., 2014). As a result, the economic efficiency of beef cow-calf to finishing systems is improved by close alignment of calving date with onset of pasture availability in the spring to improve the contribution of grazed herbage to the lifetime intake of feed (Crosson and McGee, 2015). Furthermore, operating high stocking rates through intensification of grazing (Clarke and Crosson, 2012) and optimizing individual animal performance (Crosson and McGee, 2012a; Ash et al., 2015) can enhance profitability.

International farm networks data, such as the Agri Benchmarking Project (Deblitz et al., 2016), and national data, such as Broadacre Farm Surveys in Australia (ABARES, 2018), Réseaux d'élevage in France (Institut de l'Elevage, 2018), and the National Farm Survey in Ireland (Dillon et al., 2017), have valuable databases of farm financial records based on commercial farms; however, they generally do not have sufficient animal detail to analyze and explain changes in expenditure and gross and net profits. Such data are necessary to derive the relationships among biology, farm system, and financial performance (Syrucek et al., 2017; Taylor et al., 2017a). Most studies where detailed animal and farm systems data are available have been in the context of controlled research farm conditions or have involved bioeconomic modeling of farm systems; very little such research has been conducted on commercial farms. In addition to the dearth of detailed

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animal and farm systems data, studies that are based on national statistical data include many farms where profit maximization is not the primary objective. Thus, a farm network of high-performing farms is of interest.

Studies that have compared average and high-performing commercial beef cow-calf farms have mainly focused on differences in physical farm factors and financial (Veysset et al., 2015; Taylor and Crosson, 2016), or animal (Mc Hugh et al., 2010, 2014), performance, with few studies evaluating both (Syrucek et al., 2017) and even fewer incorporating research farm systems benchmarks.

Therefore, the objectives of this study were to assess the structure and the technical and financial performance of 3 categories of beef cow-calf to finishing farms representing Irish "national-average" farms (**AVE**), farms participating in a farm improvement program (**IMP**), and a research farm systems model (**RES**) to identify the primary technical characteristics and management practices associated with farm profitability and to investigate how these determinants of profitability differ across the categories.

MATERIALS AND METHODS

Irish Grass-Based Beef Cow-Calf to Finishing Systems

The beef cow herd in Ireland comprises crossbred cows, predominantly (80%) late-maturing breed types bred to mostly (86%) late-maturing breed sires (DAFM, 2016). Cows primarily calve in spring, with 62% of beef calves born in the first 4 mo of the year (DAFM, 2016), to coincide with the onset of seasonal grass growth. Cows rear their own calves until weaning, usually at the end of the first grazing season (Drennan and McGee, 2009). Grass, either grazed or conserved, is the major dietary input within these production systems, with animals grazing from early to mid spring (February to April) until late autumn (October or November), following which they are housed indoors and usually offered a diet of grass silage (cows) supplemented with concentrate feeds (progeny; Drennan and McGee, 2009). Concentrate feeding level is a function of factors such as forage supply and nutritive value, stage of production (growing vs. finishing cattle), and animal sex (heifer, steers, young bulls) and can include high-concentrate diets, particularly for bull beef production (O'Riordan et al., 2011; McGee, 2015). Progeny can be finished indoors or at pasture, and this usually necessitates concentrate supplementation to achieve adequate performance (O'Riordan et al., 2011; McGee, 2015).

Beef cow farms can be broadly categorized into 2 production systems according to whether the progeny are sold as finished animals for slaughter (beef cow-calf to finishing) or as live animals for further feeding on another farm (beef cow-calf to live sale; Crosson et al., 2015). Further diversity is observed within finishing systems (Crosson et al., 2015; Teagasc, 2015a), with slaughter age ranging from under 16 mo, predominantly among bull systems, to greater than 36 mo, predominantly among steer systems (DAFM, 2016). This means that cattle, mainly steers, often have 3 grazing seasons before slaughter. Steer production prevails, accounting for 74% of the national male slaughtering annually (CSO, 2017).

Farm Categories

Three categories of beef cow-calf to finishing farm systems were used in this present study: AVE, IMP, and RES. All farms were suckler beef-only enterprises and did not operate a secondary enterprise on the farm. All financial data were expressed on a per hectare and per livestock unit (**LU**, where 1 LU = cattle greater than 2 yr of age) basis, for the purposes of benchmarking. This is a standard approach used in previous comparable studies (Finneran and Crosson, 2013; Taylor et al., 2017b). It is acknowledged that data pertaining to labor use on these farms (e.g., Leahy et al., 2004) would have been a valuable metric (e.g., Veysset et al., 2015), but these data were unavailable.

AVE Farms

Financial Data. The Farm Accountancy Data Network is an EU-wide network that publishes statistics on farm accounts and economics sourced from each member state (European Commission, 2016). The National Farm Survey is Ireland's contribution to the network, providing information relating to farm output, costs, and income across dairy, cattle rearing (beef cow-calf systems), cattle other (purchasing cattle systems), arable, and sheep enterprises (Teagasc, 2017a). Annually, a nationally representative sample of farms is randomly selected and the survey is completed by a Teagasc-employed data recorder in conjunction with the farmer. For the purpose of this study, a subset of the National Farm Survey representing cattle rearing farms that retained their progeny to slaughter was selected. Of these selected farms, any farm that had a secondary enterprise, such as arable or sheep production, was removed. Therefore, to correspond with the years for which information for the IMP farms was available, a sample set of 209 farm-by-year observations from an average of 41 farms per year over a 5-yr period (2010 to 2014) was extracted.

Data available for these farms included physical farm factors (e.g., farm area in hectares, number of beef cows, number of LU) and financial information {gross output value, gross profit [gross output value minus variables costs, where variable costs are defined as expenses incurred as a result of the daily running of the farm including animal feed costs, grass- and silage-related costs (expenses pertaining to lime, fertilizer, seed, and feed preservation), animal breeding, vaccination and veterinary costs, and bedding and transport costs], net profit (gross profit minus fixed costs, where fixed costs are defined as expenses pertaining to infrastructure, machinery, insurance, capital, and investment), and EU direct payments}. Financial in-