**Application:** Increasing ewe prolificacy is a key strategy to increase flock output and profitability. Across the three breed types examined (Lleyn, Belclare and Mule) no differences were recorded in ewe efficiency metrics, but the progeny of mule ewes reached target slaughter weight 10 days sooner than the progeny of Belclare ewes. This reduced age at slaughter could contribute to the environmental sustainability of lowland sheep production.

**Introduction:** Globally, the demand for sheep meat is predicted to rise by 15.7% by 2030 in line with a growing global population. Increases in production to match this demand must be achieved in the context of economic and environmental sustainability. Farmers are exploring various ways to improve the efficiency of their farming enterprises including through: increasing stocking rate (Earle et al., 2017b), replacing monocultures with multispecies swards (Grace et al., 2019) or replacing concentrate feeding with brassica crops (Dolan et al., 2022). Increasing output per ewe increases profitability per ewe and per ha (Bohan et al., 2018) and reduces the carbon footprint per kg of meat produced (Jones et al., 2014). Highly prolific ewe breed types currently present in the Irish sheep flock include Belclare, Lleyn, Blue-faced Leicester, Galway ewes (Bohan et al., 2017) and Mule ewes (F1 cross between Blue-faced Leicester ram and Black-faced mountain ewe). Combined, these breed types represent the primary maternal genetics of only 16% of ewes within Ireland (Bohan et al., 2017). The objective of this study was to compare the three most common prolific ewe breed types in Ireland in terms of ewe and lamb performance and subsequent ewe efficiency parameters in a single management system over four production years.

 **Materials and Methods:** The study commenced in October 2017 and concluded in January 2022 incorporating four full production years (from mating until subsequent lamb slaughter). Three hundred and fifty-four ewes, divided across three breed types: Belclare X (n=119), Lleyn X (n=120), and Mule (Blue-faced Leicester × Black-faced Mountain; n=115), were sourced from numerous commercial sheep flocks nationally in August 2017. These ewes consisted of breeding ewe lambs (born spring 2017; 1-year old at parturition n = 103), breeding hoggets (born spring 2016; 2-year old at parturition; n = 92), and mature ewes (born Spring 2015 or earlier; n = 170). Additional breeding ewes were purchased in August each year (to replace dead and culled ewes) and joined the ram at the point of mating (October, each year). In total n = 208 Belclare X, n = 199 Lleyn X, and n = 201 Mule ewes were included over the four-year period. Ewes were mated to Charolais rams following heat synchronisation and all ewes were housed at day 105 post ram introduction. All ewes lambed indoors, were turned out to pasture at approximately four days post partum and were weaned at 14 weeks post partum. Lambs were slaughtered at a target live weight of 46.5kg.

Animal performance data were analysed using the MIXED procedure of SAS (SAS, version 9.4, Inst. Inc., Cary, NC, USA), with the individual ewe as the experimental unit for all parameters. The model contained the fixed effects of ewe breed type, ewe age, time of first lamb crop, lambed to first service and the 2-way interactions of ewe breed type × ewe age and their interactions included in the statistical model. Combined litter weight was included as a covariate in the model and experimental year (production cycle) was included as a random term. Mean values were considered to be different when P < 0.05 and considered a tendency when P ≥ 0.05 and < 0.10.

**Results:** Ewe type had no impact of efficiency parameters ((kg lamb weight/kg ewe live weight at mating) \*100) at weaning or slaughter. Per ewe mated Mule ewes had higher (P<0.05) numbers of lambs scanned, birthed and weaned than Lleyn ewes while Belclare ewes were intermediate and not different from Mule or Lleyn ewes (P>0.10). Progeny of mule ewes had a higher (P<0.05) growth rate from birth to weaning and birth to slaughter than the progeny of Belclare ewes, resulting in a reduction of 10 days (195 vs 205 days: P<0.05) in the number of days to reach target slaughter weight.

**Conclusions:** Mule ewes as a prolific dam type results in lambs reaching slaughter weight 10 days earlier than Belclare ewes though there were no differences over all in ewe efficiency parameters of the three breed types investigated.

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