Abstract by Cristina Hurtado-Uria - Grass growth model evaluation to manage grass supply on farm in the south of Ireland

Meteorological conditions, as well as management factors, influence grass growth. Grass growth is highly seasonal in Ireland with little growth over the winter period due to low temperatures and low levels of sunshine, peak grass growth occurs in late spring and early summer, and in the late summer and autumn growth is restricted as temperature and solar radiation decline. As a result of variation in grass growth within and between years, grass budgeting at farm level is challenging. The objective of the study was to evaluate three grass growth models for use in Ireland ("Johnson and Thornley"; "Jouven"; "Brereton") using measured grass growth data at Teagasc Moorepark over a 5 year period (2005-2009). For the model evaluation of predicted versus measured grass growth, the mean square prediction error (MSPE) was used. The MSPE is the sum of three components: the mean bias (Mm – Pm)2, the line bias SP2 (1 – b)2 and the random variation about the line SM2 (1 - R2); where n is the number of measured and predicted pairs compared, Mm and Pm are the means of M and P, respectively, SP2 and SM2 are the variances of M and P, respectively, b is the slope of the line of P regressed on M, and R2 is the determination coefficient of the line. The Johnson and Thornley model over-predicted grass growth in all years, with a high primary grass growth peak and a high mean bias. The Jouven and Brereton models predicted grass growth closest to that measured as indicated by their line bias. The Jouven model under-predicted grass production but a good prediction slope was observed. The Brereton model over-predicted grass production but reported the best MSPE over the 5-year period. Most of the variation in the grass production predicted by the Brereton model was due to random variation and overall, a small line bias was observed. In 2006, a year with a high soil moisture deficit in mid-summer, the Brereton model had the best fit, with the lowest MSPE. The models with the greatest potential for grass growth prediction in Ireland, albeit with some modifications, are the Jouven and Brereton models.