

Modelling Growth & Quality of the Alfalfa-Livestock System

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Derrick Moot is the Professor of Plant Science at Lincoln University in New Zealand. He has been working on adapting livestock farm systems to climate change for over three decades. His research focuses on understanding the growth and development of crop and pasture plants as the basis on which to challenge agronomic management. His work has transformed rain-fed farming systems in summer dry regions of New Zealand. He has supervised over 100 post graduate students who have provided many of the experimental datasets used to create the APSIM_Lucerne model will be discussed in the modelling session of the congress.

Modelling alfalfa growth and development requires understanding of how the crop interacts with its environment. This paper will describe how a 20 year field based research programme has resulted in the calibration of the APSIM_Lucerne crop model. It will highlight how growth rates and time of flowering of alfalfa are affected by photoperiod which also changes the pattern of partitioning between shoots and roots over a season. Modelling these process requires understanding of light interception and therefore canopy development, radiation use efficiency and how this changes in a season. This paper describes how the pattern of assimilate movement over as season and also within a regrowth cycle was captured in the model and how this differed among cultivars of different fall dormancy rating. It will conclude by highlighting how knowledge of these crop physiological processes enabled grazing management guidelines to be challenged and the describe the resulting transformation in animal production and profitability on farms.