## MILKING THE DATA – MODELLING LACTATION CURVES IN AUSTRALIAN DAIRY CATTLE

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The lactation curve is the graph of milk production against time. Each cow in a herd has its own individual curve relating to its lactation potential and external influences such as environment and nutrition. Characteristics of the curve include persistency of lactation, total milk produced over the lactation, and time of peak production. This study aims to describe and predict the lactation curve of dairy cattle for use as a tool for breeding programs and development of management strategies at the farm level.

A data set comprising of ~9 million individual lactations was obtained from the Australian Dairy Herd Improvement Scheme. The Wood function  $W(t) = at^{b}e^{-ct}$  was used to describe the curve where W(t) is the expected milk yield at time t, and a, b, and c are parameters determining the shape of the curve. Reparameterisation was undertaken to derive parameters explaining the total volume, peak volume and time of peak for individual lactations. The Wood function was used to describe the lactation curve with a non-linear random effects model in R.

Parameter estimates for 2.6 million lactations were obtained. The average lactation had a total yield of 4067L, and peak production of 22.4L at 34 days of lactation. Of several investigated measures of persistency,  $r_{305}$ ; the ratio of milk production at peak to day 305 of lactation, was found to be most suitable. This study was able to describe the lactation curve and provide useful and biological measures to assist at the farm level of production.