

DAIRYMAN : A SIMULATION MODEL TO PREDICT THE PRODUCTION
OF DAIRY HERDS FED PASTURE

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DAIRYMAN is a computer simulation model of a dairy farm where the major food supply of the herd is pasture. The model simulates a 50 paddock farm, which is rotationally grazed, and predicts herd milk production at ten day intervals. The monthly net pasture growth rate expected for the farm is supplied by the user. Growth for each paddock is predicted at five day intervals based on the pasture growth rates specified and the amount of pasture currently in the paddock.

DAIRYMAN requires input in relation to stocking rate, calving distribution, termination of lactation, dry cow management, fodder conservation and grazing management (rotation length). This information is used to calculate the average herbage mass (kg DM/ha) and herbage allowance (kg DM/cow/day) provided to the cows in each ten day period. The pasture digestibility is predicted from the herbage mass and the time of year. The cows are grouped in classes based on their stage of lactation. The pasture intake of each class is calculated from a relationship including herbage mass, herbage allowance, digestibility, stage of lactation and liveweight. Data from grazing trials at Ellinbank Dairy Research Institute, Victoria, and Ruakura Animal Research Centre, New Zealand, have been used to derive this relationship. If supplements are being fed, the pasture substitution rate is calculated from a relationship including the amounts and type of supplement being fed (grain, hay, silage) and the pasture intake which would be predicted if no supplements were used. This relationship has been derived from published data.

Once the feed intake of the cows has been calculated, subtraction of the energy requirements for maintenance, pregnancy and growth from the metabolizable energy intake predicts the energy available for production (Ep). Data from indoor feeding experiments at Ellinbank Dairy Research Institute were used to derive a relationship enabling prediction of milk production based on Ep, the current body condition of cows, and the stage of lactation. The model predicts milk production for each class of cows, and the change in body condition for the balance between Ep and milk production.

DAIRYMAN stores the results of up to five simulations and the results of any two can be compared on the computer screen simultaneously. Graphical output assists in interpreting the results. For each ten day period, the pasture growth rates, herd feed intakes, milk production, body condition and farm income are available for output.

Trials have been initiated on three commercial dairy farms in the Macalister Irrigation Area to collect information which can be used to validate the model.

The poster includes a demonstration of the model.