WOOLMODEL - A STOCKING RATE BY PHOSPHORUS RATE DECISION AID

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The relationship between wool production from wethers, stocking rate and phosphorus fertilizer rates is defined mathematically in WOOLMODEL. This model has been developed from data collected in the south of Western Australia. Only wool production from wethers grazing annual pasture is considered.

The model predicts the level of production for a range of phosphorus and stocking rates. As it is not a whole-farm model, other farm management data needs to be considered with the partial budgets produced by WOOLMODEL.

MODEL FORMAT

The model uses equations which calculate residual soil phosphorus in units of currently applied fertilizer, phosphorus nonlimiting pasture production, the effect of stocking rate on pasture production expressed as an index, ungrazed pasture production, annual wool production per head (greasy fleece weight), and gross margin per hectare.

In WOOLMODEL, phosphorus nonlimiting pasture production (kg DM/ha/yr) is calculated from total annual rainfall (mm). Pasture response to phosphorus fertilizer is calculated using the Mitscherlich equation as in DECIDE (Bowden and Bennett 1976). In the model, pasture composition is assumed to be clover based (> 25 per cent legume content).

The effect of stocking rate on pasture production was calculated from the data of Dunlop et al. (1984).

Annual wool production (kg greasy fleece/head/yr) was related to annual pasture growth per head (kg DM/head/yr) using the equation presented by Dunlop et al. (1984).

Gross margin is calculated as the net of income minus costs.

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\text{Gross margin} = \text{revenue from wool} - \text{fertilizer cost} - \text{sheep cost} - \text{costs per hectare}
\]

WOOLMODEL presents a table of gross margins for a range of phosphorus and stocking rates. By selecting an appropriate set of phosphorus and stocking rates, the effect of other factors (annual rainfall, costs, prices, interest rate, phosphorus soil test) on production, can be studied for the current year and in the steady state situation. Instructions for using the computer program are presented by Curtis (1986).

REFERENCES


CURTIS, K.M.S. (1986). Western Australian Department of Agriculture Technote No. 4/86.


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