

FITTING MIXTURE DISTRIBUTIONS TO LEFT-TRUNCATED AND RIGHT CENSORED GRASS SWARD HEIGHTS

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Grass sward height in field plots grazed by cows follows a mixture of two distributions – one corresponding to faecally contaminated patches which the animals tend to avoid – and the other corresponding to uncontaminated areas which are freely grazed.

In the poster we present the statistical methodology and some results from fitting a mixture distribution to observed sward heights from an experiment in which heights were recorded at 250 points once a week for four weeks in each of nine plots, maintained at one of three average sward heights by the addition or removal of animals from the plot. This was to investigate whether cows were more likely to graze contaminated patches where grass supply from uncontaminated areas was limited.

Cows are unable to graze grass down to ground level and hence heights follow left-truncated distributions. Additionally, in many cases heights from rejected areas are censored as they exceed the length of the sward measuring stick. Two alternative mixture models are evaluated. Grazed areas are modelled as either a truncated normal or truncated lognormal distribution while rejected areas are modelled as a truncated censored normal. An iterative process is described to handle the censoring aspect and all six parameters (including truncation point) are estimated by maximum likelihood. The estimated mean for the rejected area population is found to be at a minimum (but not statistically significantly so) when the grass supply from uncontaminated areas was most limited.