

IS A STEER A STEER ? (OR “HOW GOOD IS MY HERD MODEL ?”)

B. GULBRANSEN

Dept of Primary Industries, Brian Pastures Research Station, Gayndah, Qld 4625

Herd simulation models have become an integral part of our pastoral research and extension services. They are used routinely to evaluate research proposals and to predict the likely effects of potential managerial changes on property income. What is commonly overlooked, however, is the critical dependence of these models on knowing accurately the relative feed intakes of different classes of stock. Errors in estimating relative intakes lead inevitably to inaccurate estimates of the numbers of cattle of different classes a paddock can carry, and just as inevitably, to inappropriate stocking rates.

Just how large and how serious might these errors be in practice? While definitive measurements of the forage intakes of various classes of grazing cattle are not yet available for reference, we can at least compare the outputs of commonly used herd models.

Three widely-used feeding standards for cattle are ARC (1980), SCA (1990) and Cambeef (1993). They all assume that the relative (as distinct from absolute) intakes of different size cattle are not influenced by pasture and environmental characteristics, implying that relative intakes can be compared on the basis of animal characteristics alone. Hunter and Siebert (1986), however, concluded that roughage quality affects both the relative intakes and the absolute intakes of different size animals.

ARC (1980) makes no allowance for breed differences in mature size, and assumes that intake is proportional to $LW^{0.75}$. SCA (1990), on the other hand, does allow for differences in stage of maturity, and estimates potential intake from the equation $I = 0.024 AZ (1.7 - Z)$, where A = standard reference weight (LW at maturity) for the animal, and Z = relative size. Assuming that relative carrying capacities for different size cattle are inversely proportional to their relative intakes, it is a simple matter to calculate relative carrying capacities from the above relationships (Table 1). Relative intakes calculated from Hunter and Siebert (1986) vary with roughage quality, but if we assume for this exercise that the animals spend half their time on each of 2 diets similar to the speargrass and lucerne diets tested by those workers, then relative carrying capacities will be as shown in Table 1.

Table 1. Relative carrying capacities predicted from ARC, SCA, Cambeef, and Hunter & Siebert, for steers with a mature liveweight (LW) of 600 kg (200 kg steer used as a base)

Steer LW (kg)	200	300	400	500	600
ARC (1980)	100	74	60	50	44
SCA (1990)	100	76	66	63	65
Cambeef (1993)	100	72	60	52	49
Hunter & Siebert (1986)	100	80	70	65	61

So a producer with a paddock carrying 100 weaner steers weighing 200 kg each and wanting to run 600 kg steers of the same breed instead, has a choice. Will he use ARC (1980) and put in 44 steers, SCA (1990) and put in 65 steers, Cambeef (1993) and put in 49 steers, or try Hunter & Siebert (1986) and put in 61 steers? And what ecological impact might such discrepancies have on pasture stability?

While the magnitude of any errors arising from inaccurate estimation of relative intakes will depend on the size of the proposed change in herd structure, the discrepancies highlighted here must concern anyone looking to make sound managerial decisions. So, in at least some herd simulation models “a steer” is not “a steer”. But, which equation, if any, is accurate under grazing conditions?

ARC (1980). The Nutrient Requirements of Ruminant Livestock. (CAB: Farnham Royal).
CAMBEEF (1993). (University of Sydney: Australia).
HUNTER, R.A. and SIEBERT, B.D. (1986). *Aust. J. Agric. Res.* 37: 549-60.
SCA (1990). Standing Committee on Agriculture. (Feeding Standards for Australian Livestock).