

## A new equation to predict feed intake by *Bos indicus* cattle

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The last Editions of the *Nutrient Requirements of Beef Cattle* (NRC 1984 and NRC 1996) developed predictive equations for dry matter intake by growing and finishing beef cattle. Current data were mainly obtained from *Bos taurus* breeds and their composites, from cattle implanted with a growth-promoting implant, supplemented with an ionophore and fed low forage diets, typical from feedlots in North America. Previous literature has shown that NRC equations overpredicted DMI for *Bos indicus* breeds. The objective of this study was to develop and validate a new predictive equation for Zebu cattle for use with a large number of data for diets with medium energy concentration and animals that have not been implanted. Meta-analyses methods were applied to 15 experiments conducted with Nellore cattle in the last 35 years. All these trials recorded daily DMI from Nellore bulls and steers fed in individual pens, group pens or electronic Calan gate feeders. Only trials conducted on universities and research stations were used to ensure an adaptation period that would minimize compensatory growth effects. Among the 176 experimental units, feeding periods varied from 62 to 277 days and dietary NEm concentration ranged from 1.01 to 1.77 Mcal/kg (51.2-74.5% TDN). The intake of NEm per unit SBW<sup>0.75</sup> was analyzed using mixed model methodology (MIXED procedure from SAS). The random experiment effect, the fixed sex effect (castrated and intact), and the continuous variables dietary NEm concentration, NEm<sup>2</sup>, and length of the feeding period were included in the model. The suggested new equation to predict feed intake by *Bos indicus* cattle is:

$$\text{DMI (kg/d)} = (\text{SBW}^{0.75} * (0,2068 * \text{NEm} - 0,03958 * \text{NEm}^2 - 0,07553)) / \text{NEm}$$

The sex effect was not significant ( $P > 0.05$ ) so this equation can be used both for Zebu steers and bulls. A comparison of the DMI predicted from the new equation and the previous NRC equations showed that at very low dietary NEm concentrations (around 1.0 Mcal/kg), *Bos indicus* have higher intakes than *Bos taurus* cattle. From low to intermediate NEm concentrations (1.0-1.4 Mcal/kg), equations yielded similar estimates of DMI. Above 1.4 Mcal/kg the new equation predicted increasingly lower intakes for Zebu than European genotypes. An independent data set with DMI from purebred Nellore young bulls was used to validate the new equation. The new equation accounted for 77.2% of variation in actual DMI and had less overprediction bias than the NRC 1984 and 1996 equations (1.3% versus 6.1 and 3.2%). The *t* test between the actual DMI and the predicted DMI by the new equation was not significant ( $P > 0.10$ ), indicating that the actual intakes and the predicted estimates did not differ from each other.

**Key Words:** beef cattle, dry matter intake, Nellore