THE NUTRITIVE VALUE INDEX AS AN INDICATOR OF THE ECONOMIC VALUE OF ROUGHAGES

J.A. Swart and P.J. Niemann

Agricultural Research Institute, Glen O.F.S.

The Nutritive Value Index (NVI) as a criterion of forage quality was introduced by Crampton, Donefer & Lloyd in 1960. This system is based on the postulate that nutritive value of forages for ruminants mainly depends on the voluntary intake of dry matter per unit body size and the digestibility of the gross energy of the forage. This Index may be readily predicted from laboratory analyses by means of suitable regression equations (Niemann, 1969a). Niemann (1969b) related NVI to energy requirements of ruminants for various functions using the caloric value of NVI as calculated by Crampton *et al.* (1962). Swart, Niemann & Biel (1967) calculated the cost of productive energy in terms of Total Digestible Nutrients (TDN) using intake of TDN and production cost of roughages per unit area as the variables. Since NVI is a measure of digestible energy intake, this Index may be used as a substitute for TDN intake in above-mentioned calculation (Swart *et al.* 1967). The equation of Swart *et al.* (1967), namely

Cost of productive TDN =

$$\frac{\text{Production cost per unit area}}{\text{TDN yield per unit area}} \times \frac{\text{Voluntary TDN intake per day}}{\text{TDN intake - TDN for maintenance}} \dots (1)$$

may be written as:

Cost of productive NVI =

$$\frac{\text{Production cost per unit area (cents)}}{\text{Dry matter yield per unit area}} \times \frac{\text{NVI}}{\text{NVI - NVI maintenance}} \dots (2)$$

or

$$= \text{Cost per unit dry matter(cents)} \times \frac{\text{NVI}}{\text{NVI - NVI maint.}} \dots (3)$$

Instead of production cost, the unit price of purchased roughages may also be used to rank roughages in terms of cost of productive capability.

According to Niemann (1969b) the NVI value for maintenance is subject to slight variation. This is of no importance if comparison are made on a fixed maintenance requirement. It is suggested that the rounded off average figure of 34 (Niemann, 1969b) be used as the standard NVI maintenance value for sheep and 23 for cattle.

Using Equation 3 it may be calculated that lucerne hay which was bought at a price of R22 per metric ton (2.2 cents per kilogram) and was found to have a NVI value of 56 (determined by the *in vitro* technique of Niemann, 1969a) would cost:

$$2,2 \quad \text{x} \quad \frac{56}{56 - 34}$$

= 5,60 cents per unit productive NVI

Good *Eragrostis teff* hay costing 1,6 cents per kg having a NVI of 40 would cost:

$$1,6 \quad \text{x} \quad \frac{40}{40 - 34}$$

= 10,67 cents per unit productive NVI.

Conversely, it may be calculated what realistic prices may be paid for roughages to be fed for production if a standard, such as good quality lucerne hay, is used as a reference. If the main purpose is maintenance, such calculations are naturally not valid. In such cases, and where forages are fed in limited amounts, digestible energy should be used as a criterium.

References

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