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Standardization of Analytical Methodology for Feeds

Proceedings of a workshop held in
Ottawa, Canada, 12-14 March 1979

Editors: W.J. Pigden, C.C. Balch,
and Michael Graham

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Postal Address: Box 8500, Ottawa, Canada K1G 3H9
Head Office: 60 Queen Street, Ottawa

Pigden, W.J.
Balch, C.C.
Graham, M.
IDRC, Ottawa CA
International Union of Nutritional Sciences

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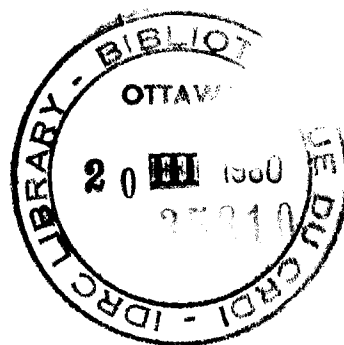
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Feed Evaluation Systems for the Tropics of Latin America

O. Paladines¹

Cattle production in the tropics is usually done totally under grazing; therefore, special consideration must be given to the feed evaluation systems used under these conditions. The specific effects that variable maintenance costs and extreme variability of the ingested diet have on evaluation systems are discussed.

Cattle production in the tropics, by virtue of the appropriate climate of the region, is done totally under grazing. Only specialized dairy cows

receive concentrated supplements, and then only in very limited quantities because an inherent low level of production per animal is accepted and expected. Moreover, hay and/or silage feeding is largely unused because of wet weather interference and because low nutritive value of the

¹Centro Internacional de Agricultura Tropical, Apartado Aéreo 67-13, Cali, Colombia.

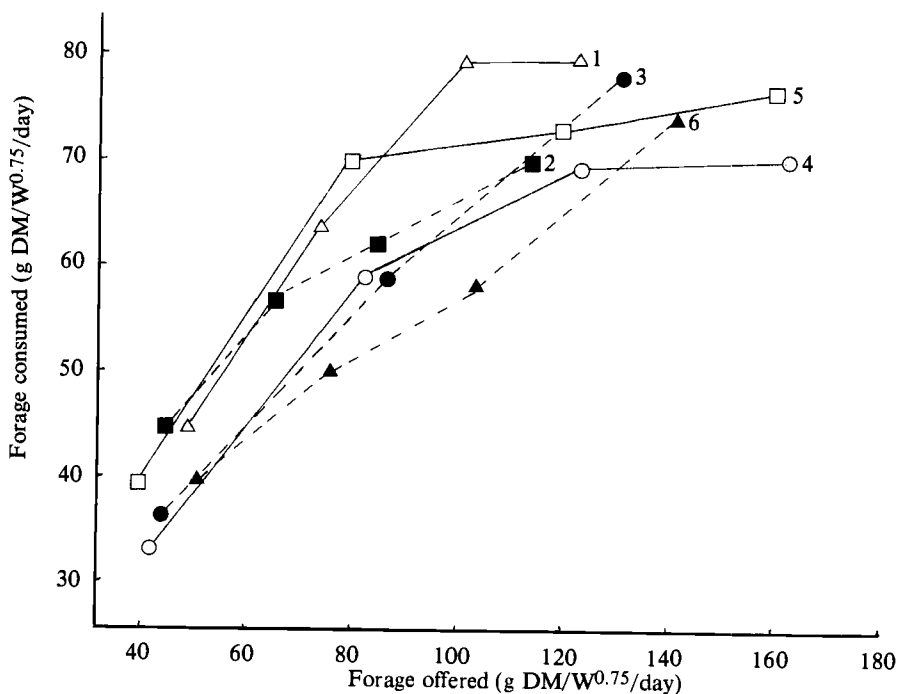


Fig. 1. Relationship between forage offered and forage consumed by crated wethers fed fresh, unchopped tropical legumes and one tropical grass: (1) *Stylosanthes guianensis* (90 days growth); (2) *S. guianensis* (150 days growth); (3) *Desmodium distrotum*; (4) *D. ovalifolium* (50 days growth); (5) *D. ovalifolium* (145 days growth); and (6) *Hyparrhenia rufa* (from CIAT, unpublished data).

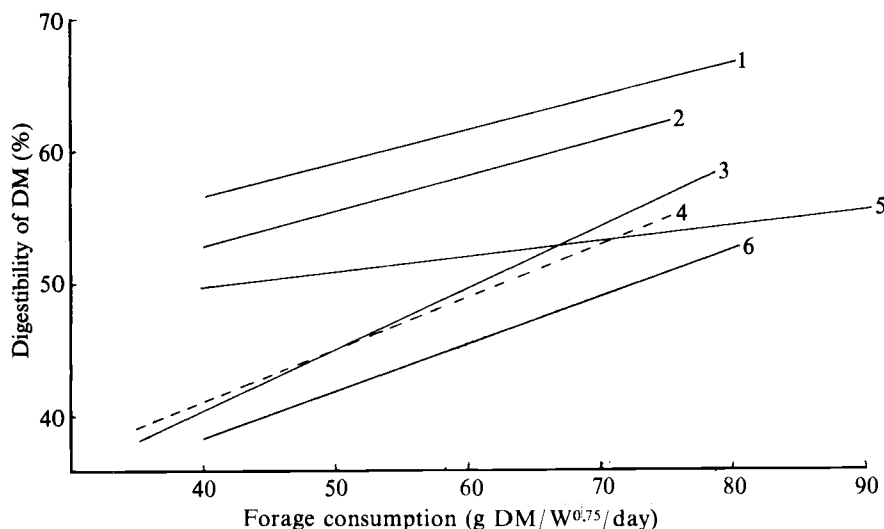


Fig. 2. Relationship between forage consumption and dry matter digestibility in several tropical legumes and one tropical grass: (1) *Stylosanthes guianensis* (90 days growth); (2) *S. guianensis* (150 days growth); (3) *Desmodium distortum*; (4) *D. ovalifolium* (50 days growth); (5) *D. ovalifolium* (145 days growth); and (6) *Hyparrhenia rufa* (from CIAT, unpublished data).

forages at the time of potential conservation makes this practice uneconomical.

Feeding standards must, therefore, be adapted to the conditions under which the animal is grazing, which primarily affects maintenance costs. These maintenance costs are influenced by: (1) variable day-night temperatures; (2) variable energy costs of harvesting the daily diet — harvesting costs are influenced by: density of sward and more precisely by leaf density in the upper strata of the sward; distance walked while harvesting; animal size (cost of movement); stocking rate or more appropriately by grazing pressure; and (3) times of low forage availability that often cause (at times severe) weight losses.

In addition to the above-mentioned effects of changing maintenance costs, feeding standards must also take into account the extreme variability of ingested diet, which varies both in quality and quantity between and within days.

The nutritive value of leaves and stems of many tropical grasses and practically all tropical legumes is different. Animals will select under grazing, and also when stall-fed green-unchopped forage, leaves over stems and terminal portions of the stems over basal parts. By selecting for leaves and young shoots, animals select for a diet of higher digestibility and also for higher intake of dry matter and digestible dry matter.

In vivo digestibilities determined in the

conventional way, at a predetermined level of refusal, are of little use because they imply a condition of feeding that can hardly be repeated under grazing. The effect that increasing the level of green, unchopped forage on offer has on dry matter intake and digestibility of several tropical forages is shown in Fig. 1 and 2.

For the conditions found the tropics, then, even the more precise methods of chemical and biological analysis of feeds and those methods that more closely predict potential animal performance will be of little value in determining feeding standards if the effects that forage availability, density of leaves in the upper strata, and animal selectivity for plants and plant parts have on the quality and quantity of the animal diet are not taken into account. Furthermore, all these factors interact with the environment (temperature and precipitation) and with the type of animal and its physiological state to alter maintenance requirements and to affect the efficiency of utilization of the ingested energy.

Finally, it should be clear that it is impossible to obtain a representative sample of the grazing animal's diet. The closest approach to it can be found in samples obtained with esophageal-fistulated animals, but even then, the continuing large variability in quality of the diet (not to mention quantity) makes this technique unreliable for prediction purposes.