CHAPTER 24

FORAGE QUALITY INDICES: DEVELOPMENT AND APPLICATION

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INTRODUCTION

Crampton (1957) demonstrated the importance of voluntary intake as a component of forage quality indices; he began that paper with these words: "The work thus far reported, aimed at establishing some index of the overall feeding value of forage, has been disappointing." At the first National Conference on Forage Quality Evaluation and Utilization, Heaney (1970) discussed quantitative forage quality indices and emphasized that such indices must include both voluntary intake and digestibility. Today, the disappointment is that in spite of many advances in understanding the biological determinants of forage quality, there has been only limited use of forage quality indices in practical feeding systems.

Definition of Forage Quality

A major limitation to practical application of forage quality information is the lack of a uniform quantitative definition or expression of forage quality. Mott (1959) suggested that differences in forage quality are expressed best as differences in animal performance (e.g., daily gain or milk production) under the conditions that 1) animals used to compare forages have a potential for production and are uniform among treatments, 2) forages are available in quantities adequate for maximum intake, and 3) no supplemental energy and protein are provided. Most livestock producers understand that differences in forage quality should mean differences in animal performance.

Animal performance is a sound theoretical definition of forage quality and can be useful for relative comparison among forages fed to, or grazed by, growing or lactating animals. To be useful in livestock feeding, however, forage quality information must be available before feeding. Furthermore, such information must be expressed in terms that can be used to predict animal performance when forage is fed alone, and to formulate supplements or mixed forage-concentrate diets to meet requirements for a targeted rate of animal production. In order to accomplish these objectives, a given forage must be assigned an absolute quality value (i.e., index number). The definition of forage quality in an absolute sense requires careful consideration of the many other factors that affect animal performance in forage-based livestock systems (Table 1).