

Herbage intake handbook—Ed. Leaver, J. D. (1982). The British Grassland Society, Grassland Research Institute, Hurley, Maidenhead, Berkshire. U.K. 143 pp. £U.K.13-00.

The objective of this well presented, readable handbook is to document and discuss the techniques used to study the intake of grass by ruminant livestock. While a number of publications on grassland research techniques are available which include chapters or parts of chapters outlining techniques used in measuring herbage intake, this Handbook brings together under one cover the various techniques available. It should therefore prove extremely useful to both students and scientists interested in studying the intake of pasture herbage by ruminants.

The production of the Handbook was undertaken by the British Grassland Society following recommendations made by the European Grazing Workshop Group. Physically it is sturdily bound, legibly printed, easy to use and contains few errors. As a reference it has an appropriate index with a list of references at the end of each chapter. The list of chapter authors denotes a group whose expertise can hardly be disputed; and their contributions show a uniformity of approach as consistent as it could be while respecting the needs of particular topics.

The Handbook's contents are arranged in six chapters. The first is an historical introduction to intake measurement and warns prospective experimenters that most of the techniques are laborious and errors leading to biased results may go undetected unless checking procedures are built into experiments. The next two chapters discuss the various sward and animal-based techniques for estimating herbage intake. The appendix to chapter three contains details for the determination of chromium and helpful hints for the routine care of animals fistulated at the oesophagus. Chapter four presents and discusses the use of feeding standards in estimating herbage intake, while in chapter five the ground rules for successfully measuring herbage intake using housed animals are detailed. The final chapter considers the components of ingestive behaviour, the techniques used to measure these components together with the magnitude and source of variation associated with them.

All chapters contain clear straightforward presentation of formulae and equations with a sensible use of figures and tables.

In summary, this Handbook achieves its objective of presenting the techniques used to study the intake of grass by sheep and cattle and discussing the advantages and disadvantages of them. I will not labour the point. It is simply that, if you need a book of this kind—it is hard to imagine how you could do better than to buy this particular one.

R. E. HENDRICKSEN

"Nutritional limits to animal production from pastures"—Ed. J. B. Hacker, (1982). ISBN 0-85198-492-4 Commonwealth Agricultural Bureaux: Farnham Royal Slough. SL2 3BN, U.K. 536 pp. £U.K.16-00.

This book reports on the Proceedings of a Symposium which examined the "state of the art" of various aspects of animal production from pastures. The Proceedings are subdivided on the basis of limitations to animal production due to pastures, chemical composition and digestibility, intake, digestion and utilization, and then considers ways in which these limitations may be overcome.

The organizers of the Symposium adopted an ambitious aim in attempting to cover the complete spectrum of animal production from pasture. It is both a strength and a weakness. The strength comes from the scope of the coverage which provides an opportunity for assessing the relative importance of various limitations and for discerning a common thread through the diverse ecological zones of pasture growth and the different fields of research. The weakness comes from the necessity to generalize in some sections in order to provide the ambitious coverage. A related

problem is the uneven examination of different aspects. Some chapters follow a broad examination and are suited for the generalist. Others concentrate on fine detail which requires a familiarity with the topic to place it in perspective.

The introductory chapters provide an overall perspective and highlight human factors, climate, stocking rate and nutritive value as the important factors limiting animal production from pastures. Subsequent papers focus primarily on nutritive value and feed utilization; these being amenable to change through technological advances.

Limiting factors are reviewed in the ten separate chapters. Together they provide a comprehensive review of current knowledge. The overwhelming message is that we are dealing with a complex process within which many factors interact, and feedback mechanisms have important modifying effects on end results. In such an environment it is not surprising that eight of the ten papers on limiting factors made a call for more reductionist research or definition of important factors. However the call for integrative studies was much more muted in these chapters.

The following ten chapters discuss ways of overcoming limitations to animal production, and they provide a nice counterbalance to the earlier section. Whereas the section on limiting factors had a large component of information from the frontiers of knowledge, chapters in the next section will be of more interest to people who wish to use existing information. Plant breeding and selection is presented as the best long-term option for overcoming nutritional limits. However it is salutary to read that despite a difference of only 0–15% in herbage production between grass species, the associated animal production varies from 0–50%. The differences are assigned to a lack of appropriate management systems. The “overcoming limitations” chapters provide few recipes for direct application on farms, but they do provide a contemporary statement on our current ability to apply technical knowledge to farm problems. A person looking for recipes will be frustrated by the breadth of production systems covered by the authors, but a generalist will be more than pleased.

The problem of animal production from pastures is complex, difficult and expensive to research, and answers are frequently specific to a region. Despite the allocation of a considerable proportion of the Symposium to ways of overcoming limitations, it is obvious that many “why’s” remain and they limit the contribution of new technology to increase production. This leads to an increased acceptance of the statement in the keynote address that “with few exceptions, any production increase has been mainly due to livestock numbers rather than productivity”. The book provides a comprehensive coverage of the topic and will serve as a useful reference volume both in its own right and from the collation of extensive lists of pertinent literature.

G. J. MURTAGH

Tropical grazing land ecosystems. A state-of-knowledge report—Prepared by UNESCO/UNEP/FAO. Natural resources research XVI. (1979) ISBN 92-3-101611-3. Published by the United Nations Educational Scientific and Cultural Organization, Paris, 655 pp. \$A28.75 (+ postage) Softcover. From Hunters Publications, Melbourne.

Since 1956 UNESCO has had interests in research programmes on natural resources of the tropical world and works such as *A Review of the Natural Resources of the African Continent* (1963) and *Natural Resources of Humid Tropical Asia* (1974) are earlier volumes in the Natural Resources Research Series. The present volume is the most ambitious yet attempted in the series. It has a broad scope and substantial coverage being broken into three main parts.

Part 1 deals with Description, functioning and evaluation of tropical grazing land ecosystems:—with individual chapters on description and floristic composition,