

INFOGRAZ: A DATA BASE FOR TROPICAL GRAZING SYSTEMS

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ABSTRACT

INFOGRAZ is a prototype of a comprehensive relational database that describes the management of, and stores information from, grazing experiments in northern Australia associated with the wool, beef, and dairy industries. It provides permanent storage and public access for detailed measurements on climate, soil, plants, and animals, which are a valuable resource for future pasture scientists and computer modellers of grazing systems. Thus it will prevent the detailed observations being lost with the passage of time. Verified data from each experiment are stored in tables which can be distributed on CD-ROM, along with procedures to access the data and use it for computer simulations. Topics across experiments are searched by key words. With sufficient resources, the database could expand and adopt an international perspective.

INTRODUCTION

Traditionally, grazing experiments that compare management options, such as stocking rate, types of forage, or fertiliser applications, generate regular observations on climate, animals, and pastures, which are analysed, condensed, and reported in a scientific journal. After publication, the detailed field observations may be retained by the scientists involved in the experiment, but with the passage of time, career changes, and restructuring of research organisations, the information is likely to be lost, or become uninterpretable without first-hand experience. At a later time, other workers who may not have been involved in an experiment, such as computer modellers interested in developing decision support packages, may need the information. Access to the information may be arranged if the original stakeholders are still committed to the topic, but access is impossible after the field data have been discarded. The problem of lost data would be avoided, and a valuable scientific resource retained for future use, if detailed information from grazing experiments was catalogued in a standard manner, stored permanently, and made publicly available. This paper describes the prototype of a database called INFOGRAZ that permanently stores detailed information from grazing experiments in northern Australia in a standard manner for distribution on CD-ROM.

METHODS

Three steps were involved in the preparation of INFOGRAZ.

1. Staff representing local research organisations were consulted to ensure their support and cooperation, and to determine the scope of the project. It was resolved, that, initially, the database should include grazing experiments from the beef, wool and dairy industries of northern Australia. It should be comprehensive, containing all observations on climate, soil, pastures, animals, and management, arranged in chronological order, by replications within treatments when these are available. By storing observations from replications, rather than treatments means, users have more opportunity to assess the variability in the observations. Treatment means can be readily calculated from replications.

2. The software chosen for the prototype was the widely used Microsoft® Access™, a relational database which has convenient facilities for creating queries, forms, reports, and macros; allows procedures to be developed for special tasks in Access Basic; and

can be distributed as software for Windows™ on personal computers. Tables were named and structured to reflect the range of data from grazing experiments (Table 1) and a table remains empty when no relevant data exists. Up to 300 variables or fields within tables were carefully defined to cater for the lack of standardisation in methods across experiments, and for variations in management or treatments that sometimes occur during long-term experiments.

3. Control of input and output has been effected by a series of forms, macros, queries and procedures. Input data are either entered directly or transferred from data files, and procedures have been developed to test the integrity of the data. After verification, the data tables are write-protected. Graphic and tabular output of treatment means for a selected range of observations are presented as reports generated by underlying queries. Also, output files can be prepared which become input files for GRASP, a simulation model from grazing systems in northern Australia (McKeon *et al.*, 1992), thereby providing a convenient comparison of observed and simulated production systems. Furthermore, procedures have been developed that allow a search across experiments based on key words. However, for many users the most useful feature will be the convenient development of customised queries or procedures to meet specific needs.

RESULTS AND DISCUSSION

Currently INFOGRAZ is the first step towards a broad vision of developing and distributing a comprehensive database for the permanent storage and retrieval of detailed measurements from grazing experiments. The initial focus on Australian experiments could expand to include experiments conducted in other countries thereby creating an international database. Obviously the formation of an international database is a long-term task, but as the database expands, separate versions could be released on CD-ROM. It is also obvious that ongoing development of INFOGRAZ requires financial resources and depends on the willingness of individual scientists and research organisations to provide the experimental data. The task is rather urgent since much existing data are in danger of being discarded due to changes in the role and staff of traditional research providers. The need to make detailed measurements available has been recognised in isolated cases by the publication of such data in printed form (e.g. McDonald *et al.*, 1995). However, INFOGRAZ presents an opportunity for such data to be available in digital form, using a standard format which would be suitable for a wide range of grazing experiments.

REFERENCES

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McKeon, G.M., K.A. Day, S.M. Howden, J.J. Mott, D.M. Orr, W.J. Scattini and E.J. Weston. 1990. Management of pastoral production in northern Australian savannas. *J. Biogeog.* **17**: 355-372.

Table 1

Names of tables in INFOGRAZ. Each table contains fields that accommodate the range in types of observations across experiments. Data are stored and linked under identification codes for treatments, replications and date.

Site description	Animal measurements	Forage measurements
Identification	Liveweight	Yield
Treatments	Wool production	Nitrogen
Animal Management	Milk production	Phosphorus
Forage management	Intake	Sulphur
Daily climate	Diet selection	Potassium
Soil description	Faecal analysis	Plant cover
Soil analysis	Carcase specification	Botanical composition
Soil water		Growth
Soil temperature		Digestibility
Soil erosion		Trees and shrubs
