THE INFIC EXPERIENCE: DEVELOPING A SYSTEM FOR ANIMAL FEED DATA EXCHANGE

G.J. FAICHNEY

Summary

The Internationl Network of Feed Information Centres (INFIC) was established in 1971 and operated as an informal association until its constitution was accepted in 1980. Fundamental to INFIC's existence is a multi-lingual nomenclature that was developed during the first years of its existence and provides, for each feed, an International Feed Description. INFIC needed the flexibility to cope with a wide range of analyses and feeding systems in different regions of the world and the development of new systems in the future. Its success depends on the reliability of the data it stores and continuing efforts are essential to ensure their validity. The support of the United Nations' Food and Agriculture Organization for the INFIC concept has been an important factor in its development.

I. INTRODUCTION

Animal production systems evolved from the use by humans of herbivores (largely ruminants and horses) and scavenging omnivores (pigs and poultry) to provide products and services from unused or otherwise unusable resources. Thus forages, surplus grains and organic wastes and by-products were, and continue to be, converted into draft power, dung for fuel or fertiliser, meat and milk products, eggs, wool and leather.

It has long been recognised that the needs of animals providing particular products or services could be met better by some feeds than by others. Thus the earliest attempts to produce feeding standards were accompanied by tables giving the comparative feeding value of the materials available. These were based on the use of 'hay equivalents' derived largely from experience rather than experiment. In the mid-1800's chemical analyses were standardised and, in 1861, Wolff compiled extended tables on crude nutrients, nutrient requirements, digestibility and feed prices (Alderman et al. 1982).

The collection of data and their compilation continued through the late 1800's and early 1900's and the production and revision of tables of feed composition and nutritive value is associated with well known names such as Kellner in Germany, Henry and Morrison in the USA and Wood and Woodman in the UK. After the 2nd World War, the advent of computers led to the development during the 1950's and 1960's of computerised feed data banks, particularly at the Dokumentationsstelle, Universit t Hohenheim in Germany (Haendler 1976) and the International Feedstuffs Institute, Utah in the USA (Harris and Kearl 1976).

At first, the systems developed were different and it became apparent that, for their best use, international co-operation was needed. At this time, the Food and Agriculture Organization of the United Nations (FAO) accepted that a most important contribution that it could make to animal nutritionists in developing countries was the provision of reliable nutritive values for feeds and, in 1970, it commissioned G. Alderman, of the Agricultural Development and Advisory Service, UK, as a consultant to review the world situation. One of his recommendations was that if FAO would "take action within the next 12 months to improve the co-ordination of activity, to standardise terminology and coding, (this) would lead to considerable dividends in the future for the speedy and efficient interchange of information and data on foods and feeds" (Balch 1983).

CSIRO Division of Animal Production, PO Box 239, Blacktown NSW 2148

As a consequence, a meeting of scientists working in this field was called by FAO at its headquarters in Rome in 1971. At this meeting, a proposal to establish an International Network of Feed Information Centres (INFIC) was accepted.

II. INTERNATIONAL NETWORK OF FEED INFORMATION CENTRES

INFIC operated as an informal association of several centres until 1980 when its constitution was accepted. The constitution states that membership is available only to institutions and organisations, not to individuals. It defines two types of full membership and also provides observing membership for interested organisations. Type I members are those involved in all aspects of the collection, storage, retrieval and dissemination of information whereas Type II members collect data for processing by a Type I member and disseminate processed information. At present there are seven Type I members, thirteen Type II members and eleven observing members covering Europe, the Americas, Africa, Oceania and Asia (Table 1).

Table 1. Countries in which INFIC members* are located

Full members		Observing members
Type I	Type II	
Australia	Costa Rica	Ethiopia
Canada	France (Maisons-Alfort)	Federal Republic of
Federal Republic of	Korea	Germany(Darmstadt)
Germany (Stuttgart)	Malaysia	Iceland
France (Theix)	New Zealand	India
Syria (Damascus)	Nigeria	Italy
USA (NAL, Beltsville)	Philippines	Norway
USA (NRC, Washington DC)	Portugal	Poland
	Spain	Sweden
	The Netherlands (CVB, Lelystad)	Syria (Aleppo)
	UK (Stratford)	The Netherlands (IVO, Lelystad)
	UK (London)	Venezuela
	USA (Seattle)	

* Only institutions or organisations can be members

The constitution sets out the general aim of INFIC as being 'To contribute to more efficient animal production throughout the world by improving access to reliable information on the composition, nutritive value and practical use of feeds for animals'. To achieve this aim, INFIC required an agreed terminology for the identification and classification of feeds, compatible systems for the storage and retrieval of the data and agreed standard methods of analysis by which to obtain and verify data for inclusion in the data bank.

(a) Feed nomenclature

Starting with an existing feed nomenclature proposed by L.E. Harris of the International Feedstuffs Institute, Utah, much work over several years culminated in the development of an International Feed Description system, with English, French and German vocabularies (Haendler 1976; Harris and Kearl 1976; Alderman et al. 1982; Balch 1983) which remains the basis of the INFIC system.

The International Feed Description is made up by combining descriptors of up to six facets:

1. Origin: Genus/species/variety and/or
   generic or common name/breed or kind/strain
2. Part(s) of material used as feed
3. Treatments applied to the material
4. Stage of maturity
5. Cutting or crop (plants only)
6. Quality or grade

International Feed Names are taken from these descriptions, either directly or with agreed simplifications, for use in feed composition tables. As an example, the International Feed Description for a red clover hay is: Trifolium pratense, clover, red; aerial part; sun-cured; late vegetative; cut 2; 17.1-19% protein. The International Feed Name would be: Clover, red; hay; late vegetative; cut 2.

For practical purposes, feeds are assigned to one of eight classes on the basis of their composition and the way they are most commonly used in formulating diets. The classes are

1. Dry forages and roughages (> 35% cell wall)
2. Pasture, range plants and forages offered fresh
3. Silages
4. Energy feeds (< 20% protein, < 35% cell wall)
5. Protein supplements (> 20% protein)
6. Mineral supplements
7. Vitamin supplements
8. Additives

Each new International Feed Description is assigned a number when it is listed in the Feed Description File. This International Feed Number consists of the class number followed by 5 digits and provides a link to the International Feed Description in different languages and to other information on the same feed. The International Feed Number for the red clover cited above is 1.01.395.

The collection of International Feed Descriptions into the International Feed Data Bank System (IFDBS) is the key to INFIC's success. The responsibility for maintaining and updating the IFDBS has been accepted by one of the Type I members, the National Agricultural Library of the USDA in Beltsville, USA. Given this centrally maintained system, it is possible for each INFIC member to function independently to meet its own needs. Such flexibility is an essential feature of INFIC because each region or country may have different requirements in terms of available feeds, livestock and rationing systems.

(b) Computer systems

The INFIC system was developed on main-frame computers and the financial and logistical requirements for operating a data base on such computers have limited the number of organisations that can be involved. However, the continuing development of micro-computer systems means that sufficiently powerful micro-computers with access to electronic data transfer systems will be available at a price that will enable any interested organisation to join and operate within INFIC. INFIC is currently testing a Personal Computer Package which should be available very soon.

(c) Data and their reliability

The INFIC system can store values obtained by many analytical techniques. INFIC itself has not attempted to encourage particular analytical practices but, for carbohydrate constituents, is guided by the recommendations of an international workshop on the standardisation of analytical methodology for feeds that was sponsored by the International Development Research Centre,

Canada and the International Union of Nutritional Sciences (Pigden et al. 1980). However, the reliability of the data included in the data base is of major importance. The credibility of any data base depends upon the confidence potential users have in its reliability. On the basis that it is better to screen data before inclusion, a range of visual and statistical checks must be applied and any apparently aberrant data flagged and checked. Ideally, regular ring tests should be run with laboratories that provide data but INFIC itself is not in a position to do this. However, at least some centres do run their own ring tests (Alderman et al. 1982).

(d) Secretariat

The administration of INFIC affairs and the maintenance of central co-ordination and continuity have been a matter of some concern because FAO could not provide funds for a permanent full-time secretariat. However, INFIC has been successful because the necessary activities of the secretariat have been supported by the generosity of, first, the US Agency for International Development in the USA, then the CSIRO Division of Animal Production in Australia and now the Centraal Veevoederbureau in the Netherlands. Currently, FAO is setting up a Trust Fund Project which, it is hoped, will provide the necessary funding.

III. CONCLUSIONS

It is clear from the development and operation of INFIC that the establishment of an agreed international terminology for feeds was fundamental - without it the network could not exist as there would be no basis for data exchange. Similarly, the reliability of the data stored is crucial - no one will use data if they are not reliable. Thus continuing efforts are needed to ensure that all data held in the system are valid.

To succeed, the IFDBS had to be flexible so as to encompass the particular needs of different countries and climatic regions. It must be able to cope with new feeds and with a wide range of analyses. It must also be able to cope with the introduction of new methods needed to provide data for new systems. For example, the new systems of protein evaluation for ruminants (Jarrige and Alderman 1987) require information on the extent of dietary protein degradation in the rumen; their more mechanistic alternatives (Faichney 1987) require information on the potential degradability and degradation rate of dietary protein and fibre (Black et al. 1982; Faichney 1983). As more information becomes available on the requirements of animals for specific nutrients and the metabolic bases of these requirements, factorial systems which use summative values like metabolisable energy will be replaced by dynamic systems that predict, for an animal's particular circumstances, its requirements for specified nutrients and then formulate a diet that will most economically meet those requirements. Such systems, of which AUSPIG (Black et al. 1988) is an example, need detailed feed composition information which can be provided by access to an appropriate feed data base.

The continuing support of FAO has been important for the success of INFIC. Although it was unable to provide financial support after its involvement in the formation of INFIC, its support for the INFIC concept has been important in encouraging governments to provide funds for the operation of their own feed information centres, thus helping to maintain and extend the network.

Finally, support for a full-time secretariat is needed. It is not unique to the INFIC experience to note that progress can be made through the activities of a few dedicated individuals. However, in the long term, governmental and international funding is required, for a secretariat as well as for regional centres, for INFIC's full potential to be realised.

IV. ACKNOWLEDGEMENT

The author is grateful to the former secretary of INFIC, Dr T.F. Leche, and the present secretary, Ir N. Benedictus, for their assistance.

REFERENCES

ALDERMAN, G., BARBER, W.P., and STRANKS, M.H. (1982). In 'Recent Advances in Animal Nutrition - 1982', p. 91, ed. W. Haresign. (Butterworths: London).

BALCH, C.C. (1983). In 'Feed Information and Animal Production', p.17, eds G.E. Robards and R.G. Packham. (Commonwealth Agricultural Bureaux: Farnham Royal).

BLACK, J.L., FAICHNEY, G.J., BEEVER, D.E., and HOWARTH, B.R. (1982). In 'Forage Protein in Ruminant Animal Production', p. 107, eds D.J. Thomson, D.E. Beever and R.G. Gunn. (Br. Soc. Anim. Prod., Occ. Pub. No. 6).

BLACK, J.L., FLEMING, J.F., and DAVIES, G.T. (1988). Proc. Aust. Soc. Anim. Prod., 17: 366.

FAICHNEY, G.J. (1983). In 'Feed Information and Animal Production', p. 191, eds G.E. Robards and R.G. Packham. (Commonwealth Agricultural Bureaux: Farnham Royal).

FAICHNEY, G.J. (1987). In 'Feed Evaluation and Protein Requirement Systems for Ruminants', p. 81, eds R. Jarrige and G. Alderman. (Office for Official Publications of the European Communities: Luxembourg).

HAENDLER, H. (1976). In 'Feed Composition, Animal Nutrient Requirements and Computerization of Diets', p. 22, eds P.V. Fonnesbeck, L.E. Harris and L.C. Kearl. (Utah Ag. Exp. Sta., Utah State University: Logan, Utah).

HARRIS, L.E., and KEARL, L.C. (1976). In 'Feed Composition, Animal Nutrient Requirements and Computerization of Diets', p. 27, eds P.V. Fonnesbeck, L.E. Harris and L.C. Kearl. (Utah Ag. Exp. Sta., Utah State University: Logan, Utah).

JARRIGE, R., and ALDERMAN, G. (1987). 'Feed Evaluation and Protein Requirement Systems for Ruminants'. (Office for Official Publications of the European Communities: Luxembourg).

PIGDEN, W.J., BALCH, C.C., and GRAHAM, M. (1980). 'Standardization of Analytical Methodology for Feeds'. (International Development Research Centre: Ottawa).