

can still be greatly troubled by gastro-intestinal disease in their grazing sheep. Whether you are a conventional or organic farmer, the basic husbandry skill of logically rotating your stock around your pastures is still needed.

This authoritative text, although obviously favouring the organic approach, does not avoid the welfare problems that can sometimes be found in some organic animal agriculture systems. These problems might become more common as the economic pressures wielded by the supermarket-dominated human food industry forces more organic producers to adopt intensive practices, which would seem somewhat foreign to the 'original' relatively small, largely self-contained, organic family farms. The issue of the increased production costs inherent in some organic systems is dealt with in a number of places in the text. The economic differences between organic and conventional largely depend, of course, on the width and depth of the actual comparison. When fully costed, many organic systems are competitive (or near competitive) to the more intensive conventional enterprises. Even so, many organically produced foods do seem relatively expensive to the shopper. In one section in the book there is a discussion of the animal welfare implications of these relative costs: this section is aptly headed "The consumer's role: to pay the price".

Reading this impressive volume makes one realise how much good old-fashioned common-sense was lost when animal production largely replaced animal husbandry in our agricultural and veterinary teaching institutions.

The many wide-ranging and often realistically presented ideas, and the masses of pertinent information in this book will be of great value not only to organic agriculturists and the veterinary professionals who have to help them deal with their welfare and disease problems, but also to the many others interested in the general concept of disease, in health planning and veterinary preventive medicine, and in the fascinating interplay between animal production, health, disease, welfare and environmental sustainability.

Roger Ewbank

Ealing, London, UK

The Mycotoxin Blue Book

Edited by D Diaz (2005). Published by Nottingham University Press, Manor Farm, Main Street, Thrumpton, Nottingham NG11 0AX, UK. 349 pp Paperback (ISBN 1 904761 19 4). Price £55.00.

The Mycotoxin Blue Book is, as its name suggests, a comprehensive and up-to-date text covering all aspects of mycotoxin production and the impact of these toxins on farm animals, companion animals and human health. As such, sections of the book will be of interest to a variety of professionals, including both large and small animal veterinary clinicians, and those in the fields of agriculture, animal nutrition, food hygiene, biotechnology and medicine.

The Mycotoxin Blue Book benefits from multi-authored chapters, written by specialists from a number of continents. Emphasis is given to the global significance of mycotoxins,

providing details of how climate dictates the key mycotoxins produced in geographical regions. Each chapter is well-referenced giving easy access to the current literature for those wanting to research certain aspects in greater depth. Specific points are illustrated with science-based examples and clearly annotated diagrams.

Mycotoxins are introduced as a complex group of toxic secondary metabolites produced by fungi. Historically, toxic effects associated with mycotoxins were first recognised when aflatoxicosis was diagnosed as the cause of Turkey 'X' syndrome in the UK in the early 1960s. Since that time, several hundred mycotoxins have been described, although extensive study has focused on groups such as the aflatoxins, ochratoxin A and the fusariotoxins (eg trichothecenes, zearalenone).

The mechanism of action and the pathological and observed clinical effects of each of the major classes of mycotoxins are summarised. Acute, subacute and chronic toxic effects are covered; the latter including a range of insidious effects on multiple body systems, for example, appetite and growth restriction, and immune suppression, which have become of increasing importance in production animal health.

A chapter on mycotoxin interactions explains that the outcome of exposure to mycotoxins is dependent on the dose, duration of exposure and interactions with factors such as age, gender, nutritional status, genetics, environmental factors, health status and the mix of mycotoxins. The complex effects of mycotoxins on antioxidant status and immune status are presented, covering mechanisms of action and options for use of supplementary antioxidants to mitigate their effect.

As a consequence of the ubiquitous nature of exposure to mycotoxins, and their toxic and sometimes carcinogenic potential, many countries have legislation that regulates the maximum permitted level of mycotoxin residues within feedstuffs. Given the economic and health implications of screening agricultural products for mycotoxins, and deciding whether they are fit for consumption, the importance of optimising the analytical procedures used is highlighted. Options for mycotoxin sampling plans are presented, covering the stages of sampling, sample preparation (including grinding and solvent extraction) and analysis. Potential for error and variability at each stage of the testing process are outlined, and methods to minimise these factors are discussed. The principles and applications of mycotoxin analysis are covered in detail in a chapter that explains the range of fully quantitative, semi-qualitative and qualitative methodologies available. The reader's attention is drawn to the importance of technique validation studies, quality assurance and laboratory accreditation schemes. This section enables the non-expert to gain a greater understanding of the general considerations for mycotoxin analysis and interpretation of the test results obtained.

The chapter on mould growth and mycotoxin production illustrates the range of factors that affect these processes, including environmental variables (eg temperature, aeration, moisture content) and physical variables (eg insect

and mechanical damage, fungal abundance). Mycotoxin production can occur pre-harvest, post-harvest and under storage conditions. Information is included on management techniques to avoid mould growth and mycotoxin production in agricultural crops. Options for decontamination and detoxification (chemical, biological and physical methods) of mycotoxins in feedstuffs are presented together with current advances for mycotoxin sequestering substances, which can be incorporated into animal diets to limit mycotoxin intestinal absorption (eg silicate materials, yeast cell wall-derived agents).

Many of the chapters review details of mycotoxin exposure relevant to a particular species or group of animals. Aspects such as differential species susceptibility, particularly in poultry and farmed fish species, and key mycotoxin-related syndromes in different taxa are included. Examples of the latter include zearanelone toxicity in swine, leukoencephalomalacia attributable to fumonisins in horses, hepatocellular carcinomas attributable to aflatoxicosis in farmed rainbow trout and Balkan endemic nephropathy caused by ochratoxicosis in humans.

Dietary variation between animal groups alters the likely sources and types of mycotoxin exposure (eg grain-based diet, fresh and preserved forage, legumes, bedding). For example, the disease perennial ryegrass staggers and fescue toxicosis are potentially important conditions for grazing livestock feeding on fresh forage in some regions, versus aflatoxicosis in poultry fed a cereal-based diet. Mycotoxins are described as one of the major factors suppressing commercial poultry productivity with the potential to cause reduced growth and feed conversion rates, decreased egg production, leg problems, carcass condemnation and immune suppression predisposing to secondary infectious disease.

The chapter on ruminants notes the importance of bacterial fermentation in the rumen for degrading and metabolising dietary mycotoxins and how the toxins' effects differ from those in the monogastric species. The section on domestic pets reinforces the importance of ensuring that dogs are not allowed to scavenge on mouldy domestic produce (eg cheese, bread, rotten fruits) and provides clinical details of acute toxicity and the management of these cases.

The additional importance of chronic mycotoxin exposure in horses, domestic pets and humans, when compared with production farm animals, is highlighted due to their anticipated longer lifespan. The differential importance of various routes of mycotoxin exposure in humans are discussed, including direct exposure through the consumption of contaminated feedstuffs (not only cereals and oilseeds, but also wine, beer, coffee and other crops), and indirect exposure through meat, eggs or milk.

Although the referencing and indexing of the book are excellent, I found the order of chapters to be rather confused as they did not appear to follow a logical plan. For example, the grouping together of the chapters covering details of sampling feeds for mycotoxin analysis and the principles of mycotoxin analysis would perhaps have been more intuitive. Similarly, the taxa-specific chapters would have been more

sensibly grouped as a section, and the use of a similar template of subheadings could have facilitated more rapid access to comparable information between these chapters.

The Mycotoxin Blue Book is certainly comprehensive; however, I was disappointed to see that there was no chapter dedicated to the effects of mycotoxin exposure on free-ranging wildlife. Brief mention was made of the results of the small number of studies screening pet and wild bird foods for aflatoxin and/or ochratoxin A residues in the chapter on companion animals. However, no details were given of the few cases where multiple mortalities of wild birds have been documented as attributable to mycotoxicosis; for example, acute aflatoxin exposure in waterfowl in North America and fusariotoxicosis exposure in sandhill cranes. Furthermore, the recent literature includes debate regarding the potential significance of supplementary provisioning of free-ranging wildlife as a source of mycotoxin exposure, for example, in wild turkeys (*Meleagris gallopavo silvestris*) and white tailed deer (*Odocoileus virginianus*) in North America, and reference to this topic may also have been worthwhile.

Altogether, criticisms of the book are few and this text represents excellent value for money, to be recommended for libraries and individuals alike. It is clear that exposure to mycotoxins has the potential to adversely impact the health and welfare of a wide range of vertebrate species across various geographical regions. Access to the detailed information within this authoritative guide will assist decision-making for diagnosis and help to mitigate the effects of mycotoxin exposure in the future.

Becki Lawson

Institute of Zoology

Zoological Society of London, UK

Responding to the Livestock Revolution — The Role of Globalisation and Implications for Poverty Alleviation (BSAS Publication 33)

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The term 'livestock revolution' refers to the emerging pattern of milk and meat production in the developing world. Demand for these products is predicted to grow at about 8 times the rate expected for developed countries, almost 3% annually, ie demand will double by 2020. Will this demand be met by local production, which would clearly benefit local livelihoods, or will global trade take over the markets?

Of the 24 chapters in this stimulating book, 15 have at least one co-author who is based in a developing country; work is reported from Bolivia, Nepal and Vietnam, as well as from countries that are more familiar in the development literature. Summarising the main papers presented at important conferences in Mexico and the UK in 2002 and 2003, the book considers the economic, geographic and ecological