

The challenges facing grassland agronomists are becoming increasingly complex, with environmental and ethical issues assuming a greater significance alongside more conventional technical aspects. Agronomists need to be equipped to address these new problems, requiring skills and understanding not found within traditional agronomy texts. This new edition of *Agronomy of Grassland Systems* addresses the need for a different approach, providing novel and provocative material to instruct, stimulate and enthuse the reader.

The volume opens with an overview chapter providing a perspective on grassland systems, followed by a chapter that considers their emergence as socially constructed systems with a history and a tradition. Subsequent chapters cover the generation, vegetative growth, flowering and seed production of grassland, together with mineral nutrition, grassland quality and animal intake. The management implications of forage–animal interactions are discussed with respect to improving the efficiency of livestock production, and a concluding chapter considers the design of grassland systems.

This new expanded edition has an increased emphasis on systems thinking and contains forward-looking, perhaps sometimes provocative, concepts. Several chapters are completely new while others have been up-dated to reflect current concerns, knowledge and practice. As such it will provide a valuable resource for students, teachers and practitioners alike.

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C. J. Pearson and R. L. Ison  
Frontmatter  
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## **Agronomy of Grassland Systems**

Second Edition

# Agronomy of Grassland Systems

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## Contents

### Preface xi

### 1. Overview:

#### perspectives on grassland systems i

- 1.1. The social construction of grassland systems 2
- 1.2. Grassland issues or problems 4
- 1.3. Systems thinking 8
- 1.4. Representing grassland systems 9
  - 1.4.1. *Modelling* 10
- 1.5. Purposes of grassland systems 15
- 1.6. Further reading 17

### 2. The emergence of grassland systems 18

- 2.1. Biological and ecological models that give rise to grassland systems 20
  - 2.1.1. *Clementsian succession* 20
  - 2.1.2. *'New' thinking* 21
  - 2.1.3. *The origins of 'range science'* 23
  - 2.1.4. *Traditional or 'mainstream' approaches to grassland system development* 23
- 2.2. Technologies that reveal and conceal – a case study 24
  - 2.2.1. *Increasing productivity* 25
  - 2.2.2. *Thirty to fifty years later* 27
  - 2.2.3. *Stepping outside our traditions* 27
  - 2.2.4. *Responsibility in technology design* 28
- 2.3. Present grassland systems 28
  - 2.3.1. *Global distribution of grassland systems* 28
  - 2.3.2. *Animal industries* 30
  - 2.3.3. *Grassland plant domestication* 33
- 2.4. The agronomic manipulation of grassland systems 35
- 2.5. Further reading 36

### 3. Generation 37

- 3.1. Sources of seed 37
- 3.2. Sown seed 42
  - 3.2.1. *Time, rate and depth of sowing* 43
  - 3.2.2. *Method of cultivation and sowing* 44
  - 3.2.3. *Nutrition and seed treatment* 45
  - 3.2.4. *Grazing* 46
  - 3.2.5. *Herbicides* 47
  - 3.2.6. *Burning* 47
- 3.3. Dynamics of the seed bank 48
  - 3.3.1. *Seasonality of seed banks* 48
  - 3.3.2. *Dormant and active seed* 49
- 3.4. Germination 53
- 3.5. Vegetative generation 55
- 3.6. Systems modelling 56
- 3.7. Further reading 59

### 4. Vegetative growth 60

- 4.1. Emergence 61
  - 4.1.1. *Seedling type* 62
  - 4.1.2. *Seed size and genotype* 62
  - 4.1.3. *Seed bed* 63
- 4.2. Establishment 63
- 4.3. Forms of development 65
  - 4.3.1. *Apex position* 65
  - 4.3.2. *Leaves* 65
  - 4.3.3. *Branches or tillers* 67
  - 4.3.4. *Roots* 68
- 4.4. Growth 69
  - 4.4.1. *Interception of radiation* 70
  - 4.4.2. *Utilization of radiation* 71
  - 4.4.3. *Carbon balance* 71
  - 4.4.4. *Efficiency of net primary productivity* 72
- 4.5. Regrowth 73
- 4.6. Environmental effects on growth 74
  - 4.6.1. *Water availability* 74
  - 4.6.2. *Temperature* 75
  - 4.6.3. *Nutrition* 75
  - 4.6.4. *Fire* 75
- 4.7. Competition 76
  - 4.7.1. *Thinning* 76
  - 4.7.2. *Competitiveness and growth rate* 76
  - 4.7.3. *Weeds* 77
  - 4.7.4. *Trees* 77
- 4.8. Grazing effects on growth and development 78
- 4.9. Long-term changes in species composition 80
- 4.10. Modelling plant growth 80
- 4.11. Further reading 82

### 5. Flowering and seed production 83

- 5.1. Juvenility 83
- 5.2. Morphological changes at flowering 84
- 5.3. Flowering 85
  - 5.3.1. *Environmental controls of flowering* 85
  - 5.3.2. *Autonomous flowering* 88
  - 5.3.3. *Development of the inflorescence* 88
- 5.4. Fertilization and seed formation 89
  - 5.4.1. *Breeding systems* 89
  - 5.4.2. *Anthesis and fertilization* 91
  - 5.4.3. *Seed production* 92
- 5.5. Implications for grassland growth and management 94
  - 5.5.1. *Flowering and growth rate* 94
  - 5.5.2. *Flowering and quality* 95
  - 5.5.3. *Selection of cultivars* 95
  - 5.5.4. *Sowing time* 96

## Contents

5.5.5. <i>Management by defoliation</i>	96
5.5.6. <i>Fertilizer application</i>	97
5.5.7. <i>Diseases and pests associated with flowering</i>	97
5.6. <i>Systems modelling</i>	97
5.7. <i>Further reading</i>	98

## 6. Mineral nutrition 99

6.1. <i>The nutrient network</i>	99
6.2. <i>Soil fauna and flora</i>	102
6.2.1. <i>Rhizosphere organisms</i>	102
6.3. <i>Uptake by plants</i>	105
6.3.1. <i>Uptake of inorganic nutrients</i>	105
6.3.2. <i>Cation anion balance</i>	105
6.3.3. <i>Soil acidification by legume pastures</i>	106
6.4. <i>Distribution of nutrients within the plant</i>	107
6.5. <i>Senescence and element release from dead material</i>	107
6.5.1. <i>Herbage death</i>	108
6.5.2. <i>Dung and urine</i>	108
6.5.3. <i>Decomposition</i>	108
6.6. <i>Animal intake</i>	110
6.7. <i>Losses from the system</i>	110
6.8. <i>Element deficiency and fertilizer needs</i>	111
6.9. <i>Implications for grassland growth and management</i>	112
6.9.1. <i>Pesticides and herbicides</i>	112
6.9.2. <i>Types of N, P, K, S fertilizer</i>	113
6.9.3. <i>Efficiency of utilization of fertilizer</i>	114
6.9.4. <i>Amount of fertilizer required</i>	114
6.9.5. <i>Timing of fertilizing</i>	116
6.9.6. <i>Type and method of application of fertilizer</i>	116
6.9.7. <i>Grassland maintenance and restoration</i>	116
6.10. <i>Models for nutrient management</i>	117
6.11. <i>Further reading</i>	118

## 7. Herbage quality and animal intake 119

7.1. <i>The basis of herbage quality</i>	119
7.1.1. <i>Chemical composition</i>	120
7.1.2. <i>Cell structure</i>	121
7.1.3. <i>Variation among species</i>	122
7.1.4. <i>Ageing</i>	124
7.1.5. <i>Environment</i>	125
7.1.6. <i>Palatability and edibility</i>	126
7.2. <i>Injurious substances</i>	126
7.3. <i>Sward structure</i>	129
7.4. <i>Herbage availability: grazing pressure</i>	130
7.5. <i>Animal type and productivity</i>	132
7.5.1. <i>Animal type</i>	132
7.5.2. <i>Utilization of energy</i>	133
7.5.3. <i>Intake and productivity</i>	133

7.6. <i>Implications for management</i>	134
7.6.1. <i>Production systems</i>	134
7.6.2. <i>Research and development towards managing nutritive value</i>	138
7.7. <i>Systems approaches</i>	139
7.8. <i>Further reading</i>	139

## 8. Grassland – animal interactions and management 140

8.1. <i>Animal effects on grassland</i>	140
8.1.1. <i>Selective grazing</i>	140
8.1.2. <i>Pulling</i>	141
8.1.3. <i>Treading and poaching</i>	142
8.1.4. <i>Fouling</i>	142
8.2. <i>Grazing management systems</i>	143
8.2.1. <i>Production per animal and per area</i>	143
8.2.2. <i>Herd experience, composition and timing of operations</i>	145
8.2.3. <i>Grazing interval: set stocking and block grazing</i>	146
8.2.4. <i>Regional grazing systems</i>	148
8.3. <i>Conservation and supplementation</i>	149
8.3.1. <i>Carryover feed</i>	149
8.3.2. <i>Hay and silage</i>	150
8.3.3. <i>Crop residues and by-products</i>	152
8.3.4. <i>Fodder crops</i>	153
8.3.5. <i>Supplements</i>	154
8.4. <i>'Feed year' planning</i>	155
8.5. <i>Efficiency of livestock production</i>	157
8.5.1. <i>Energy budgeting</i>	157
8.5.2. <i>Legume versus nitrogen-fertilized grass systems</i>	159
8.5.3. <i>Efficiency of use of support energy</i>	159
8.6. <i>Systems perspectives</i>	159
8.7. <i>Further reading</i>	160

## 9. Grassland systems design 161

9.1. <i>Grasslands in farming systems</i>	161
9.1.1. <i>Farming systems perspective</i>	161
9.1.2. <i>Integration of grasslands and cropping</i>	162
9.1.3. <i>Economic analysis</i>	166
9.1.4. <i>Gender and culture</i>	169
9.1.5. <i>Farm technology</i>	170
9.2. <i>Grasslands and other forms of human activity</i>	171
9.2.1. <i>Agro-industrial systems for using grassland plants</i>	172
9.2.2. <i>Grasslands in aesthetics and conservation</i>	174
9.3. <i>Design of future grassland systems</i>	174
9.3.1. <i>Participation in designing</i>	175
9.3.2. <i>Future scenarios</i>	177
9.4. <i>Regional design</i>	177
9.5. <i>National issues</i>	180

## Contents

<i>9.5.1. National purposes for grassland systems</i>	180
<i>9.5.2. Grassland research</i>	182
9.6. Global design	183
<i>9.6.1. Human health and food supply</i>	183
<i>9.6.2. Biodiversity</i>	185
<i>9.6.3. Sustaining organic matter and nutrients</i>	185
<i>9.6.4. Responding to climate change</i>	186
9.7. Conclusion	186
9.8. Further reading	187

<b>References</b>	188
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<b>Index</b>	218
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## Preface

Our worlds have changed significantly since we wrote the preface to the first edition in March 1986. The problems and opportunities surrounding grassland system change appear to us to have become more complex. The sustainability and ethical issues that we drew attention to in the first edition have assumed even greater importance. No longer can a grassland agronomist be concerned with only the technical issues that have preoccupied grassland agronomy for most of the last 50 years. In the last decade the failure of most project attempts at pastoral development in Africa have become apparent as has the increased nutrient pollution of intensive European grassland systems. The displacement of rainforest by pasture land has assumed international importance, as has the need to maintain biodiversity and concerns for the loss of organic matter from many agricultural soils. These trends were apparent to us in 1985–86 and informed our thinking as we prepared the first edition. The challenges we face are even more apparent today and convince us that traditional modes of research and development are no longer adequate.

The complex, messy problems that the next generation of grassland agronomists will attempt to address will require skills and understanding that are not found within conventional agronomy texts. Thus for many readers this new edition will be very different in its approach to grassland agronomy.

The extensive changes within this second edition also reflect our own changing perspective on the nature of grassland systems. We remain committed to a systems perspective. Systems-thinking receives greater emphasis than in the first edition. A systems perspective is first and foremost a way of thinking but because our ways of thinking determine what we do, then thinking is rarely divorced from action. Our aim is to facilitate action in grassland system improvement. This of course draws attention to what we mean by improvement and who participates in

defining improvements. These questions are crucial if we are to (i) meet the needs of the more than 700 million people who currently go hungry; (ii) provide food and fibre at affordable prices for almost 100 million more people every year; (iii) maintain and enhance productivity per unit of land because there is very little new land to use; and (iv) do all of this in such a way as to conserve and not further degrade natural resources and the environment.

As we noted in our preface to the first edition, television, popular books and the growing environmental consciousness have made the public aware of the beauty and complexity of the world's so called 'natural' grasslands: the Eurasian steppes, the African rift valley and veldt, the Australian savanna, the Argentinian pampas and the North American plains. However, in the last decade we have come to appreciate the pervasiveness of human activity and to begin to question what we mean by 'natural' and 'nature'. At the other extreme are the grassland systems more clearly created by humans for specific purposes – milk, meat, fibre, draft-power, aesthetics, etc. These grassland systems are often able to capture more solar energy and employ more people than in cropping systems. Many grasslands are also a more significant sink for carbon dioxide than mature forests, which has implications for the way we respond to the greenhouse effect. While the efficiency with which grassland systems convert energy into products is low, ruminant livestock often remain the only practical means of converting solar energy into products and services that are useful to humans. In many societies the people who need and use these products and services are the rural poor.

In 1986 we were excited at the prospect of bringing a systems perspective to a new generation of grassland agronomists. In the subsequent decade we are aware that our book was adopted as a text in Australia, Britain, Canada, Japan, New Zealand and



the United States and was translated into Spanish. The first edition was the subject of many favourable reviews. Reviewers made many valuable suggestions as to how it might have been improved or the balance of subject treatment altered. We thank our colleagues for these comments and suggestions and we have reconsidered them as we prepared this edition. We have retained the structure of the original book. Our increased focus on systems thinking is not at the neglect of traditional agronomic understanding. For us it is the context and awareness in which this traditional understanding is used that is critical, and this guides the sequencing of our chapters.

Our book is also a contribution to the discussion: What is agronomy becoming? In the last decade our own careers have moved towards concerns with the design and development of learning systems. We invite fellow 'teachers' to take our material as a basis for the design of learning experiences for students that are relevant locally and feasible culturally. Our aspiration is that a text of this type might trigger new ideas and reflections in a wide and geographically dispersed readership. In the end it will only prove to be successful if the concepts and ideas are put into practice in designing and managing grassland systems. We hope by maintaining our focus on systems concepts and biological principles and by avoiding prescriptions, because of their limited local relevance, that this second edition will continue to give satisfaction and enthuse.

We thank once again our partners June and Catherine for their support and continued encouragement. We also thank our colleagues and students who have supported, stimulated and challenged us over the last decade.

*C.J Pearson and R.L. Ison*  
Brisbane, Australia and Milton Keynes, UK, January 1997.