

Contents

<i>Acknowledgements</i>	page vii
1 Introductory	1
2 The quantitative description of growth	9
3 Phyllotaxis	27
3.1 Spiral and other systems of phyllotaxis	28
3.2 The parameters of phyllotaxis	35
3.3 The Fibonacci angle – irrational or inevitable?	42
4 Shoot-apical systems	56
4.1 Flax, <i>Linum usitatissimum</i> L.	56
4.2 Tobacco, <i>Nicotiana tabacum</i> L.	81
4.3 Cauliflower, <i>Brassica oleracea</i> L.	91
4.4 Blue lupin, <i>Lupinus angustifolius</i> L.	97
4.5 Subterranean clover, <i>Trifolium subterraneum</i> L.	100
4.6 Eucalyptus, <i>Eucalyptus grandis</i> Hill and Maiden, and <i>Eucalyptus bicostata</i> Maiden, Blakely and Simmonds	116
4.7 Wheat, <i>Triticum aestivum</i> L.	131
4.8 Fig, <i>Ficus elastica</i> Roxb. ex Hornem.	146
4.9 Yellow serradella, <i>Ornithopus compressus</i> L. <i>Dianella</i> sp. (Liliaceae) Narrow-leaf wattle, <i>Acacia mucronata</i> Willd. ex H. Wendl Sunflower, <i>Helianthus annuus</i> L.	157
5 The dynamics of leaf growth	163
5.1 Subterranean clover	163
5.2 Wheat	172
5.3 Relative rates of change, R and G	177
6 The growth of an inflorescence	183
7 The growth of wheat tillers	199
8 Plant growth as integration	207
8.1 Physical constraint as a determinant of growth rate	207

Cambridge University Press

978-0-521-11287-1 - The Shoot Apex and Leaf Growth: A Study in Quantitative Biology

R. F. Williams

Table of Contents

[More information](#)*Contents*

8.2 Constraint and the genesis of form	<i>page</i> 212
8.3 Organization of the shoot apex	214
Appendix	223
A.1 Three-dimensional reconstruction	223
A.2 Volume estimation by serial reconstruction	227
A.3 Phyllotaxis	230
A.4 Age equivalence and covariance	236
A.5 Data processing and presentation	239
A.6 Cell counting	243
A.7 Conversion table	244
<i>References</i>	245
<i>Indexes</i>	251