

Contents

Preface	v
List of Symbols	ix
1. Nature, Measurement and Control of Air-flow	1
General	1
Air-flow over surfaces	6
Air-flow over plant canopies	13
Air-flow within plant canopies	18
Measurement of wind	24
Swinging Plate anemometer	24
Cup anemometer	25
Vane anemometer	26
Pitot tube	27
Pressure tube anemograph	29
Hot-wire anemometer	29
Laser-Doppler anemometer	32
Pulsed-wire anemometer	32
General survey techniques—flags and visualisation	33
Control of wind in experimentation	35
Wind-breaks	36
Wind-tunnels	40
2. Response of Single Leaves to Wind	45
Exchange processes	45
Terminology	45
Results	50
Energy balance and surface temperatures	54
Solutions of the heat balance equation	55
Significance of plant temperature	58
Effect of wind on water use	61
Theory	61
Observations	63
Effect of wind on photosynthesis	69

3. Response of Whole Plants to Wind	75
Growth rate	75
Wind-tunnel experiments	76
Shaking experiments	79
Loss of leaf area	80
Developmental influences	81
Wind sway and plant stability	86
4. Wind in Relation to Crops	91
Exchange processes—general	91
Profiles of <i>K</i>	93
Exchange between canopy and atmosphere	99
Particles—general	103
Deposition on crops	108
Take-off	111
Dispersal of Particles	115
Lodging—principles involved	120
Model experiments	123
Field observations	125
Physiology of sheltered crops	130
The yields of sheltered crops	135
5. Ecological Aspects	143
Vegetation zonation in mountains—general	143
The climate of mountains	144
Mountain winds	148
Tree growth in mountainous areas	155
Zonation above the tree-line	167
Zonation near coasts	174
Observations	174
Possible causes	177
Evolutionary aspects	182
References	185
Subject Index	201