

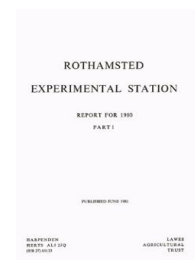
Thank you for using eradoc, a platform to publish electronic copies of the Rothamsted Documents. Your requested document has been scanned from original documents. If you find this document is not readable, or you suspect there are some problems, please let us know and we will correct that.



ROTHAMSTED
RESEARCH

Report for 1980 - Part 1

[Full Table of Content](#)



Index

Rothamsted Research

Rothamsted Research (1981) *Index* ; Report For 1980 - Part 1, pp 297 - 307 - **DOI:**
<https://doi.org/10.23637/ERADOC-1-137>

SUBJECT INDEX

The General Report by the Director (pp. 9–16) has not been indexed.

- Acaulospora laevis*, 203
 Acephate, on sugar beet, 74
 Acid brown soils, 229, 230
 'Acronal 4D', 130, 131
Actinomadura spp.,
 diagnostic keys for, 267
 isolation of, 191
 2-acylcyclohexane-1,3-diones, 126
 ADAS, 254
 ADAS Aerial Photography Unit, 71
 Aerial pollution, effect on barley growth, 56, 57
 Aerobiology, 168, 169, 177, 180
 Agricultural meteorology, 165, 166, 168, 169
Agropyron repens (couch grass), as the origin of take-all, 184
Agrotis segetum, migration studies of, 98
 Aldicarb
 as an aphicide, 32
 as a nematicide, 31, 32, 150, 151, 153, 154, 156
 effects on spread of ryegrass mosaic virus, 189
 on barley, 22
 on beans, 27, 29
 on peas, 30, 32
 on sugar beet, 68, 69, 151, 152
 on winter wheat, 17, 19, 21
 uptake by earthworms of, 135
 Aldicarb sulphone, leaching of, 129, 136
 Alkali metals, co-ordination chemistry of, 141
 Alkaline earth metals, co-ordination chemistry of, 141
Allolobophora longa, 101
Alternaria spp., 23
 growth of, 191
 on ripening grain, 190, 191
 Amino acids
 accumulation of, 38
 S-adenosyl-L-methionine, 38
 analysis of, 39
 β carotene, 258
 cysteine, 39, 40
 in clubroot diseases of cabbage, 132
 lysine, 36, 38, 39, 43
 methionine, 36, 38–40
 N-terminal sequence of, 40
 proline, 39
 sulphur group, 39
 synthesis of, 36
 threonine, 36, 38, 43
 4-trans-hydroxyl-L-proline, 38
 tryptophan, 39
 Ammonia, assimilation of, 37
 Ammonia oxidising bacteria, 209
 Anemometers, 168
 Anystid mites, as aphid predators, 74
 Anthelmintics, survey of, 269
 Aphicides
 aldicarb, 32
 for sugar beet, 64
 'Metasytox', 182
 pirimicarb, 17
 See also: Insecticides; Pesticides
 Aphid
 alarm pheromone of, 126
 bulletins, 64
 caught in suction traps, 74, 182, 183
 detection of barley yellow dwarf virus in, 181
 effect of aldicarb on, 21
 effect of pirimicarb on, 21
 forecasting, 99, 100
 Aphids (contd.)
 genetic variability of populations, 95, 96
 infectivity of *Erynia neoaphidis* conidia for, 95
 infectivity with barley yellow dwarf virus, 182, 183
 insecticide resistance, 73, 74, 120, 121, 125
 iso-enzyme typing of, 95, 96
 migrations, 99
 on beans and peas, 27, 32
 on hops, 99, 100
 on ryegrass, 96
 on sugar beet, 64, 65, 72, 73
 on virus infected cereals, 92, 93
 on winter wheat, 21, 22
 overwintering, 99
 predators of, 21, 73, 74
 transmission of bean yellow vein-banding virus by, 189
 transmission of potato virus Y by, 183
 vector specificity of isolates introduced by, 183
 virus transmission by, 125
 Aphids, scientific names of,
 Acyrtosiphon pisum, 27, 32, 95, 189
 Aphis fabae, 27, 74, 99
 Macrosiphum avenae, 182, 183
 Macrosiphum euphorbiae, 74
 Metopolophium sp. 21, 182
 Metopolophium dirhodum, 92, 93, 128
 Myzus persicae, 64, 73–75, 120, 121, 125, 126, 182, 189
 Phorodon humuli, 99, 100
 Rhopalosiphum padi, 21, 181–183
 Sitobion avenae, 21, 92, 93, 95, 128
 Apis cerana, sacbrood virus in, 94
 Aphis fabae, as an aphid predator, 74, 75
 Aspergillus spp.,
 on winter wheat, 23
 spore germination in, 191
 Aspirin, stimulation of resistance-associated Pr-proteins by, 180
Atomaria linearis, on sugar beet, 69
Aureobasidium, spp., on ripening grain, 190
Aureobasidium pullulans, on winter wheat, 22, 23
 Auxanometers, 167
 Auxin
 in sugar beet, 59
 in wheat grains, 56
Azotobacter, spp., inoculation of lettuce with, 205
 Bactericides, to control soft rot of potatoes, 176, 194
 Bangladesh, deep water rice grown in, 154
 Barley
 ammonia concentrations in, 53
 aphids on, 128, 129
 apical development, 23
 aspartate kinase from, 38
 barley yellow dwarf virus, 22, 92, 93, 175, 176, 181–183
 benodanil on, 23
 biochemical mutants of, 38, 39
 continuous, in take-all experiment, 184
 effect of aerial pollution on, 56, 57
 effect of deep cultivation on, 167
 effect of deep incorporation of P and K on, 24
 effect of drought on, 167
 effect of 'Milstem' on, 133
 effect of respiratory substrates on CO₂ compensation concentration, 52
 effect of sowing date on, 23, 24

INDEX

- Barley** (*contd.*)
 effect of subsoiling, 24, 25
 effect of timing of nitrogen on, 23, 24
 endoplasmic reticulum from endosperm, 41
Erysiphe graminis (mildew) on, 22, 168, 179
 fluoride content of, 56
 fungicides for, 186
 grain size, 54, 55
 grain yield, 186
 growth regulators for, 23, 24
 homoserine dehydrogenase from, 38
 leaf area, 25
 leaf growth, 167
 light transmission, 25
 membrane-bound polysomes from, 40, 41
 model for growth and yield, 166, 167
 mutants of, 53
 nematodes on, 150
 'Nitro-Chalk' on, 23
 on Broom's Barn Farm, 76
 on Hoosfield, 114
 on Rothamsted and Woburn, 109, 110
 photorespiratory mutants, 38
 production of dry matter, 167
 reduced tiller production, 56
 resistance to 'Milstem', 121
 response to nitrogen, 267
Rhynchosporium secalis on, 178, 179, 186, 187
 root measurements, 26
Septoria on, 22
 shoot measurements, 25
 soil and water measurements for, 26
 spikelet numbers, 23
 stomatal resistance, 25
 storage proteins, 40, 41
 straw yield, 186
 tissue cultures from, 43
 transformation studies with, 43
 tridemorph on, 23
 uptake of ¹⁴C-labelled phenylureas by, 135
 virus diseases of, 22
 water stress in, 39
 water use, 167
 yields, 24, 56
See also: Cereals; Erysiphe graminis; Take-all
- Beans** (*Vicia faba*)
 aldicarb on, 27
 aphids on, 27
Apion vorax on, 28
 aspartate kinase from seeds of, 38
 at Rothamsted and Woburn, 110
 benomyl on, 27
Botrytis fabae (chocolate spot) on, 189
 effect of weather on, 27
 foliar feed experiment with, 207
 fosetyl-Al on, 27, 190
 fungal diseases of, 28, 29
 fungicides for, 189, 190
 leaf roll virus of, 27–29
 nematodes on, 29, 152, 157, 158
 pests and pathogens of, 26, 27
 root disease in, 28, 189, 190
 seed bed dressings of benomyl on, 189, 190
Sitona spp., on, 27–29
 use of foliar sprays on, 189, 190
 yields, 17, 27
See also: Phaseolus vulgaris
- Bedfordshire**, soil survey in, 214
- Beef**, production of, 267, 268
- Bees**, *See* Honeybees
- Beetles**
 carabid, as aphid predators, 74
 carabid, on sugar beet, 73
Sitona spp., 27–29
- Bendiocarb**
 on sugar beet, 68, 69
 use in bird repellents, 130, 131
- Benodanil**
 as a fungicide on potato, 195
 on winter barley, 23
- Benomyl**
 for control of take-all, 133
 on clover, 115, 116
 on oilseed rape, 192
 on ripening grain, 190
 to control chocolate spot on beans, 189
 to control root disease of field beans, 190
 residual effect of, 186
- Benzylgeranyl**, 126
- BHC**, *See: HCH*
- Biodeterioration**, of ripening grain, 190, 191
- Birds**
 damage caused to sugar beet by, 67
 repellents for, 131
- Bore Place Farm**, 102
- Botrytis fabae** (chocolate spot), on beans, 29, 189
- Brassica crops**, protoplast culture in, 42
See also: Cabbage
- Brickheaths**, distribution of, 257
- British Gas Research Division**, 232
- Broadbalk**
 classical experiments on, 114, 115
 earthworms on, 101
 potatoes on, 115
 recovery of ¹⁵N labelled fertiliser by wheat on, 247
 wheat on, 108, 115
- 2-bromobenzanilide**, as a fungicide for potato, 195
- Broom's Barn**
 crop rotations at, 76
 livestock, 76, 77
 weather at, 286
- Buckinghamshire**, soil survey in, 214
- ¹³C nuclear magnetic resonance titrations**, 144
- Cabbage**
 clubroot on, 132
 3, 5-D on, 121
- Calcium**
 effect on VA mycorrhizal infection, 204
- Cambridgeshire**, soil survey in, 214
- Captafol**, on ripening grain, 190
- Carabid beetles**
 as predators of aphids, 74
 on sugar beet, 73
- Carbendazim**
 as a fungicide on peas, 33
 on potatoes, 196
 on ripening grain, 190
- Carbofuran**
 as a nematicide, 150
 on sugar beet, 68, 69, 75
- Carbon**, content of in soil biomass, 253
- Carbon dioxide assimilation**, rates of, 51
- Carbon dioxide compensation concentration**, of rye-grass cultivars, 51, 52
- Carbon dioxide enriched atmosphere**, growth of barley mutants in, 53
- Carbon flux**, in cereals, 53
- Carboxin**, as a fungicide on potato, 195
- Carboxymethylcellulase activity**, 37
- Catalase activity**, in barley mutants, 53
- Cation-exchange capacity**, 230, 251
- Central Electricity Research Laboratory**, 233
- Cereals**
 aphids on, 128, 129
 carbon flux in, 53
Erysiphe graminis on, 22, 130, 134, 168, 186
 grain size in, 54, 55
 immature embryos from, 43
 seed treatments against slugs in, 128
 stem borers on, 129
 storage proteins in, 35, 39–42
 take-all on, 37, 133, 184, 208, 243, 244, 246
 thrips on, 129
See also: Barley; Erysiphe graminis; Maize; Oats; Take-all; Wheat
- Chemical labelling**, of splash-dispersed drops, 179
- Chloride**, leaching of in cropped soil, 249
- Chlorine dioxide**, as a bactericide for potatoes, 194
- Chlorophyll**, biosynthesis of, 38

INDEX

- Chloroplasts, photosynthesis by, 51
 Chromium, toxicity of, 254
Cladosporium spp. (sooty mould), 23
 on ripening grain, 190, 191
 on virus-infected wheat ears, 93
 Classical experiments, 114–116
Claytonia perfoliata
 purification of beet mild yellowing virus from, 181
 Cleveland, soil survey in, 216
 Clover,
 benomyl on, 115, 116
 diseases of, 187, 188
 fungi found in roots of, 188
 in Classical experiments, 115, 116
 inoculation of with VA mycorrhiza, 203–205
 nematodes on, 152
 Clubroot, *See: Plasmodiophora brassicae*
 Clwyd, soil survey in, 219, 233
 Cobalt, content of in topsoil, 257
 Cockroach, *See: Periplaneta americana*
 Common scab, *See: Streptomyces scabies*
 Computer programs
 ARC Metadata system, 87
 CAMPAC, 87
 data-bases, 86
 DECODE, 231
 for field experiments, 274
 for molecular geometry, 147
 for soil survey, 231
 for statistical analyses, 269
 GHOST, 87
 GRASP, 87
 languages, 80
 LINDAT, 231
 model for behaviour of fluometuron, 129
 model for behaviour of pesticides in soil, 136
 Open System Interconnection, 80
 Rothamsted General Survey Program, 86, 273
 SYMVU, 87
 Winter wheat modelling, 246, 247
 See also: Statistical programming
 Computers
 applications, 86, 87
 ARC Computing Committee, 81
 Communications processors, 84, 86
 computer graphics, 146, 147
 concentrators, 85, 86
 data management, 166, 231
 data verification, 269
 Honeywell H716 processors, 83–86
 IBM 370, 146, 147
 IBM 1130, 147
 ICL System 4, 83, 146, 147
 Jacquard J100 systems, 82
 mainframes, 84, 85
 maintenance, 85
 management services section, 87
 manpower, 80
 microprocessors, 168
 operations and telecommunications section, 81–84
 plotters, 85
 Prime 300, 84, 86
 Prime 550, 82, 84–86, 147
 Quantimet 720, 225, 227
 software, 85, 86
 system failures, 83
 system utilisation, 82
 training, 87
 word processing, 82, 85
Conidiobolus obscurus, 208, 209
 Controlled drop application, of pesticide sprays, 130
 Copper
 concentrations of in soil solutions, 254
 content of in topsoil, 257
 toxicity of, 254
 Cotton
 Fusarium wilt on, 156
 root-knot nematode on, 154, 155
 Couch grass, *See: Agropyron repens*
 Crystal structure, determination of, 145
Culicoides, elemental analysis of, 98
 Cumbria, soil survey in, 216
Cylindricarpon spp., on sugar beet roots, 76
 3, 5-D, 121, 132, 133
 'D-D', as a nematocide, 150
 DDT, 120, 121
 Decomposition, of ¹⁴C labelled plant material, 253, 254
 Degradation, microbial, 135
 Deltamethrin, 120, 123, 125
 on sugar beet, 74
 Demeton-S-methyl, on sugar beet, 74
 Density gradient centrifugation, 208
 Department of Agriculture, Northern Ireland, 87
 Department of the Environment, 254
 Derbyshire, soil survey in, 215
 Devon, soil survey in, 218
 Diazinon, degradation of in soils, 136
 Dichlorophen, as a bactericide for potatoes, 194
 Dicyandiamide, in soils, 259
 Differential sedimentation, 208
 3-(4, 8-dimethyl-3,7-nonadienyl)sulpholene, 126
 Dimexan, 249
 Dinoseb, 186
 Direct drilling, of wheat, 116, 183
 Disulphide bonds, 40
 cDNA cloning, 41
 Dodecanoic acid, aphid resistance to, 125
 Dorset, soil survey in, 218
 Drainage pipes, elemental sulphur in, 257, 258
 Drought experiments, 166, 167
 Dry rot (*Fusarium solani* var. *caeruleum*), 196
 Durham, soil survey in, 216
 Dyes, fluorescent, for splash droplets, 178
 Dyfed, soil survey in, 219, 222
 Earthworms
 effect of direct drilling on, 101
 effect of organic matter on, 101
 effect on wheat growth, 101
 for protein production, 102
 uptake of aldicarb by, 135
 waste disposal by, 102
 East Anglia, soil survey in, 214, 215
 East of Scotland College of Agriculture, 257
 Eggs, statistical analysis for prediction of grades, 268
 (Z)-11-eicosen-1-ol, 126
Eisenia foetida, 102
 Electroantennography, for honeybee pheromone research, 96
 Electrostatic spray systems, 166, 169
Entomophthora aphidis, 95
 Enzyme-linked immunosorbent assay (ELISA), 65
 Enzymes
 alcohol dehydrogenase, 43
 aspartate kinase, 38
 catalase, 53
 cell-wall degrading, 37
 elastase, 145, 146
 glutamine synthetase, 37, 38, 53
 homoserine dehydrogenase, 38
 inhibitors of, 38
 nitrate reductase, 43
 proteolytic, 36
 RuBP carboxylase/oxygenase, 50
Ephestia kuehniella, 121
 pheromones of, 126, 127
Epicoccum spp., 23
 on ripening grain, 190
Erwinia caratovora (tuber soft rot), on potatoes, 193, 194
Erwinia carotovora var. *atroseptica*, spread of, 178
Erynia neophidis, 95
Erysiphe betae (powdery mildew on sugar beet), 65
Erysiphe graminis (barley mildew)
 deposition of spores, 166, 168
 incidence of, 22
 residual effect of systemic fungicide on, 186

INDEX

- Erysiphe graminis* (contd.)
 sensitivity of to triadimenol, 134
 sprays for, 130
Erysiphe polygoni, on peas, 29, 32
Escherichia coli, nematodes feeding on, 159
 Essex, soil survey in, 214, 215
 Ethephon, on winter barley, 23
 Ethionine, in foliar sprays, 132
 Ethirimol
 for control of mildew, 133, 134
 resistance of barley to, 121
 Ethoprophos, as a nematicide, 150
 Eyespot (*Pseudocercospora herpotrichoides*), on wheat, 183
- 'F849' (Uniroyal) as a fungicide, on potato, 195
 Farmer's lung disease, protection from, 192
 (E)- β -farnesene, 126
 Fascioliasis, 222, 224
 Fenamiphos, as a nematicide, 150
 Fens, sugar beet trials on the, 69
 Fertiliser prediction, for winter wheat, 249, 250
 Fertilisers
 residues of, 251
 Survey of Fertiliser Practice, 268
 See also: Nitrogen fertilizers; Phosphate fertilizers; Potassium fertilizers
 Field desorption mass spectrometry, 144
 Field Drainage Experimental Unit, Cambridge; 257
 Field Experiments
 computer programmes for, 274
 crop yields, 243
 small plots, 113, 114
 working party for, 113
 Field Plots Committee, 113
 Fluometuron, leaching of, 129
 Fluorescent labelling, of splash droplets, 178
 Fluoride, level of in barley, 56
 Fluotrimazole, on peas, 30
 'FMC 35001', on sugar beet, 68, 69
 Fosetyl-Al, on field beans 27, 190
 Fumigants, soil effect on nematodes, 150
 Fungi
 growth of, 191
 on sugar beet roots, 76
 spore germination, 191
 water activity in, 191
 See also: Fungus diseases; *Fusarium*; *Gaeumannomyces-Phialophora* complex; Mycorrhiza; Take-all
 Fungicides
 aniline, for potatoes, 195
 foliar sprays, 133
 for oilseed rape, 192
 inhibition of mycelial growth and spore germination by, 190, 191
 on winter barley, 23
 on winter wheat, 17, 22, 23
 resistance to, 121, 134
 to control chocolate spot on beans, 189
 to control the microflora of ripening grain, 190, 191
 Fungus diseases
 chocolate spot, 28, 29
 rust (*Uromyces fabae*), 29
 Septoria, 22
 See also: *Erysiphe*; Eyespot; *Fusarium*; Take-all
Fusarium spp.
 on cotton, 156
 on potatoes, 195
 on sugar beet roots, 75, 76
 on winter wheat, 22, 23, 183
Fusarium sulphureum, on potatoes, 196
- Gaeumannomyces graminis* var. *graminis*, 36, 176, 177, 184
Gaeumannomyces graminis var. *tritici*, 36, 37, 184, 207, 208
Gaeumannomyces-Phialophora complex, 35-37, 184
 bioassays with, 37
 carboxymethylcellulase activity of isolates, 37
- Gaeumannomyces-Phialophora* (contd.)
 host-infection tests with, 37
 oat-attacking isolates, 36
 on roots, 36
 on wheat seedlings, 37
 pathogenicity of, 37
 polygalacturonase activity of, 37
 Gaseous diffusion, in soil crumbs, 169, 170
 Genetic manipulation, of crop plants, 35, 42, 43
 Gibberellins, in wheat grains, 56
Gigaspora margarita, 202
 Gleadthorpe Experimental Husbandry Farm, 268
 Gliadin, 39
Glomus caledonius, 201, 202, 204, 205
Glomus epigaeus, 203
Glomus fasciculatus, 202, 203
Glomus mossae, 202, 203
 Gloucester, soil survey in, 215
 Glutamic acid, effect of on photorespiration rates, 52
 Glutamine synthetase, in barley leaves, 53
 Glyphosate, 187
 GOGAT activity, in barley leaves, 53
 Gordiids, See Hair worms
 Gradients, of spore dispersal, 179, 180
 Grain, ripening, microflora of, 190, 191
 Grain, wheat
 developing, protein bodies from, 40
 free sulphate content of, 39
 gliadin from, 39, 40
 S-deficient, 39
 Grass crops
 at Rothamsted and Woburn, 111
 diseases of, 187, 188
 nematodes on, 152, 153
 take-all after, 185, 186
 See also: Ryegrass
 Grassland map, England and Wales, 212, 220, 221
 Grassland, nitrification inhibitors for, 249
 Gravimetric determination of mean temperature, 259
 Growth substances
 auxin, 56
 gibberellins, 56
 indoleacetic acid, 55
 Gwent, soil survey in, 215
 Gwynedd, soil survey in, 219
- Hair worms, comparison with nematodes, 161
 Hampshire, soil survey in, 217
 Hanbury Park Farm, 232
 Hares, damage to sugar beet caused by, 67
 HCH, 120
 Herbicides
 effect of on number and viability of *Rhynchosporium secalis* spores, 186, 187
 on sugar beet, 64, 67
 simulation of movement of in soil, 256
 See also: names of chemicals used as herbicides
 Hereford and Worcester, soil survey in, 215
 High Mowthorpe Experimental Husbandry Farm, 232
 Honeybees (*Apis mellifera*)
 alarm pheromones of, 96, 121, 126
 clustering, 97
 electroantennography for, 96
 Nasanov pheromone of, 97, 126
 Nosema apis on, 94
 poisoning of, 127
 pollen collecting, 99
 queen pheromone of, 97
 viruses of, 93, 94
 Hoosfield
 Permanent Barley Experiment on, 114
 wheat on, 108
 Hops, aphids on, 99
 Hordein, 40-42
 genes of, 40
 Host/plant pathogen relationships, 36, 37
 Housefly (*Musca domestica*)
 biological studies, 124
 knock-down resistance in, 120, 124, 125
 properties of lipids in, 124

INDEX

- Humberside, soil survey in, 216
Hyalodendron, on ripening grain, 190
 Hydraulic conductivity, 169, 171, 172
 Hydraulic conductivity cell, 165
 ICI, 242
 Image analysis, use of in splash-droplet measurement, 177
 Imazalil
 as a fungicide for potato, 196
 on oilseed rape, 192
 on ripening grain, 190
 Immunospecific electron microscopy, 176, 187, 189
 Indoleacetic acid, in wheat grains, 55
 Infectivity index, 182
 Infra-red photography, of sugar beet, 70, 71
 Inhibitors
 of nitrification, 248
 of urease, 248
 Insect traps
 light traps, 100, 101
 suction traps, 183
 See also: Traps
 Insecticides
 chlorinated hydrocarbons, 120
 housefly resistance to, 120, 124, 125
 leaching of, 129
 lipophilic, 120
 phenylureas, 121
 selectivity of, 127
 spray application, 129, 130
 transport of, 121
 use of on sugar beet, 68, 69
 See also: Aphicides; Nematicides; Pesticides; pyrethroids; names of individual insecticides
 Insects
 chemoprinting of, 98
 elemental analysis of, 98
 insecticide resistance in, 120, 121
 light traps for, 100, 101
 neuroanatomy of, 123, 124
 rearing of, 131
 See also: Insect traps; names of individual insects.
 International Crops Research Institute for the Semi-Arid Tropics, 201
 Ionophores, effect on stomata, 145
 Iprodione, as a fungicide on beans, 189
 Irrigation
 effect on spring beans, 17
 effect on winter wheat, 17
 for sugar beet, 72
 Isle of Wight, soil survey in, 217
 Iso-enzyme typing, of aphids, 95, 96
 Isolation, selective, of actinomycetes, 191
 Isotope ratio determination, 259
 John Innes Institute, 42
 Kjeldahl analysis, 242
 Lacewings, statistical analysis of, 266
 Land drainage, 171
 Leaching, of nitrate, in cropped soil, 249
 Leaf juice extractor, improvements to, 258
 Leaf protein, extraction of, 258
 Leather jackets, on sugar beet, 69
 Leeks, use of host photosynthate by fungus in, 252
 Legumes, virus diseases of, 187–190
 See also: Clover; Lucerne
 Leicestershire, soil survey in, 215, 216
Lentiscus, nematodes on, 160
Leptosphaeria maculans (canker), on oilseed rape, 192
 Lettuce, inoculation of with mycorrhiza, 205
Leucaena, nematodes on, 154
 Ley-arable experiments, 186
Limnaea truncatula, ecology of, 222–224
Limothrips cerealium
 feeding mechanisms of, 92
 on cereals, 129
 Lincolnshire, soil survey in, 215, 216, 224, 225
 Little Knott, take-all on, 207, 208
 Liver fluke, interactions with soil type, 222–224
 Livestock
 at Broom's Barn Farm, 76, 77
 at Rothamsted and Woburn, 111
 statistical analysis for, 267, 268
 Locusts, neuroanatomy of, 123, 124
Lolium multiflorum, *See* Ryegrass
 Lucerne, nematodes on, 152
Lumbricus terrestris, 101
 Lupins, soil micro-organisms on, 208
Lycopodium (club moss), spores of, 168
 Lysimeters, 172
 MAFF Sea Fisheries Laboratories, 87
 Maize
 aspartate kinase from, 38
 forage, nematodes on, 152–154
 inoculation of with mycorrhiza, 204
 Maneb, on ripening grain, 190
 Manganese, concentrations of in displaced soil solutions, 254, 255
 Maps, soil, 212, 214, 219, 230, 232, 233
 Mean temperature, gravimetric determination of, 259
 Mebenil, as a fungicide for potato, 195
 Media
 for *Gaeumannomyces-Phialophora* complex, 37
 for isolation of field and storage fungi, 191
 Mepiquat chloride, on winter barley, 23
 Messenger RNA, 37
 Metalaxyl, on field beans, 190
 Metal salts, induction of Pr-proteins by, 180, 181
 Meteorological Office, the, 229
 Methyl bromide, on sugar beet, 75
 Microencapsulation, 130, 131
 Microflora, of ripening grain, 190, 191
 Micromass 602D mass spectrometer, 259
 Micronutrients, 254, 255
 Microprocessors, 168
 Microsporidia, 93, 94
 Midlands, soil survey in, 215, 216
 Mildew *See Erysiphe graminis*
 Millipedes, damage to sugar beet caused by, 67, 69
 'Milstem' *See* Ethirimol
 Moths
 pea moth monitoring, 30
 pheromone traps for, 31, 97, 98
Musca domestica, *See* Housefly
 Mutant plants, synthesis of amino acids in, 35, 36
 Mycelial growth, inhibition of by fungicides, 191
 Mycorrhiza, vesicular-arbuscular
 'active' infection of lettuce with, 205
 biochemical studies of, 204, 205
 effect of aldicarb on, 154
 effect of calcium on, 204
 effect on plant growth and internal P concentration, 251
 electron microscope studies with, 205
 endophyte trial, 203
 field inoculation studies, 201, 202
 models of infection spread, 252
 nutrient film technique for, 202
 spread of inoculum, 202
 NA³⁶Cl, leaching of, 129
 Nasonov pheromone, *See* Honeybees
 National College of Agricultural Engineering, 116
 National map programme, 212, 214
 National Research & Development Corporation, 123, 129, 130
 National Soil Inventory, 214
 National Vegetable Research Station, 206
 Nematicides
 aldicarb, 150, 152
 carbofuran, 150
 'D-D', 150
 'D-D'/methyl isothiocyanate mixture, 150
 effect on cereal cyst nematodes, 150, 151
 effect on root ectoparasitic nematodes, 150
 effect on yields, 150, 151

- Nematicides (cont.)**
ethoprophos, 150
fenamiphos, 150
granular, 150
foliar application of, 151
methyl bromide, 150
non-fumigant, 150
organophosphorus, 150
oxamyl, 150, 151
oximecarbamate, 150, 151
vertical band applicator for, 151
- Nematodes**
beet cyst-nematode, 151
cereal cyst-nematode, 151, 158
chemical control of, 149–152
comparison with hair-worms, 161
cyst, control of, 150, 151
cyst, pathotypes, 156, 157
cyst, taxonomy of, 266
deterministic characters for identification of
Meloidogyne, 160
effect of fumigation on, 150
extraction of cyst nematodes, 162
feeding behaviour, 159, 160
food flow in stylet feeders, 159, 160
fungi on, 158, 159
hatching of, 157, 158
interaction with *Rhizobium*, 156
migratory, 32, 154
morphology and fine structure of, 160
new species of *Heterodera*, 160, 161
on barley, 150
on beans, 29, 152, 157, 158
on clover, 152
on cotton, 154, 155
on *Leucaena*, 154, 155
on lucerne, 152
on maize, 152
on oats, 152
on onions, 152
on peas, 152
on pigeon pea, 154
on potatoes, 150, 151, 156, 157
on sorghum, 154
on sugar beet, 150, 151
on taro, 155
on tomatoes, 150
on wheat, 21, 150, 153
pathogens of, 158, 159
pea cyst-nematode, 151, 157
potato varieties resistant to, 151, 157
rice root-knot, 154
root ectoparasitic, 150, 152, 153
root lesion, 153
scanning electron microscopy for study of, 160
spear bearing, 21
stem, 114, 152, 157, 158
sugar beet cyst-nematode, 158
Nematodes, scientific names of,
Caenorhabditis elegans, 159
Criconeumonoides, 154
Ditylenchus dipsaci, 114, 152, 157, 158
Globodera rostochiensis, 150, 151, 155, 157, 162
Globodera pallida, 150, 151, 155, 157, 162
Helicotylenchus spp., 21, 75, 153, 154, 156
Helicotylenchus varicaudatus, 153
Helicotylenchus vulgaris, 152, 156
Hemicycliophora, 154
Heterodera avenae, 151, 154, 159
Heterodera carotae, 160
Heterodera cruciferae, 160
Heterodera goettingiana, 151, 156, 157, 160
Heterodera schachtii, 151, 158
Hexatylus viviparus, 160
Hirschmanniella sp., 155
Longidorus spp., 159
Meloidogyne spp., 160
Meloidogyne acrona, 154
Meloidogyne graminicola, 154, 160
Meloidogyne graminis, 160
- Nematicides (cont.)**
Oxycarboxin, as a fungicide on potato, 195
Oxfordshire, soil survey in, 217
Oxamyl, as a nematicide, 150, 151
Organic matter, effects of on soils at Woburn, 252, 253
Opto-electrical colour matching system, 165
Opomyza spp., on winter wheat, 100
Open-cast coal sites, 232
Onychinus spp., on sugar beet, 69, 70
nematodes on, 152, 154
inoculation of with mycorrhiza, 203
Onions
mosaic virus, 188
Olipidium radiale, as a vector of red clover necrotic
Olipidium brassicae, 188
regeneration of from protoplasts, 42
Pyrenopeziza brassicae on, 192
male sterility in, 42
Leptosphaeria maculans on, 192
growth response to triadimefon, 176
effect of chemicals applied to stubble, 192
diseases of, 192, 193
Oiled rape
varieties resistant to stem nematodes, 152
nematodes on, 152
meta-toxicity in, 254
Gaeumannomyces-Phialophora complex on, 36
at Rothamsted and Woburn, 110
at Broom's Barn, 76
Oats
Nutrient uptake rate, for winter wheat roots, 246
Nuarimol, for control of take-all, 133
NRDC 185, 127
NRDC 108, 127
NRDC 157, 123
Nosema apis, 93
North Yorkshire, soil survey in, 216
Northamptonshire, soil survey in, 216
Nodules, root, ammonia assimilation in, 37
Noctua pronuba, migration studies with, 98
Nitrogen metabolism, 35, 36
Nitrogen in soils, 245
symbiotic, 204
estimation of in the field, 207
Nitrogen fixation
timing of, 23, 24, 267
response to in spring barley, 267
response of ryegrass to, 267
265, 266
relationship with N concentration in wheat grain,
rates of application, 20, 21
prediction of requirements, 249, 250
on winter wheat, 17–20, 53, 54
NO₃-N, 20
15N labelled, recovery of by winter wheat, 247
for sugar beet, 64, 67, 72
Nitrogen fertilisers
Nitritification inhibitors, 242, 248, 249
leaching of in cropped soil, 249
in wheat stems, 245
Nitrate
Nitrapyrin, 248, 249
NIA 16388, 123
Netherlands Soil Survey Institute, 231
Nematophthora gynophila, 158, 161, 162
Xiphinema elongatum, 156
Xylenchus spp., 21, 154
Xylenchus spp., 21, 31, 32, 75, 153, 154
Trichodorus spp., 150
Scutellonema spp., 156
Rotylemehulus reniformis, 156
Rotylemehulus, 154
Radopholus ritieri, 65
Pratylenchus thornei, 156
Pratylenchus neglectus, 153, 154
Pratylenchus spp., 21, 29, 31, 32, 75, 153, 154, 156
Paratylenchus, 152, 153
Paratylenchus, 153
Paratrichodorus anemones, 153
Meloidogyne incognita acrita, 156

INDEX

- Paleosols, clay mineralogy of, 256
Parachordodes wolterstorffi, 161
 Park Grass, soil micro-organisms from, 208
 Pea moth, *See* Moths
 Pearl millet, tissue cultures from, 43
 Peas
 aldicarb on, 30, 31
 aphids on, 30
 aspartate kinase from, 38
 Erysiphe polygoni on, 29, 30, 32, 33
 fungal diseases of, 32, 33
 glutamine synthetase from leaves of, 38
 leafless, 17, 29, 30, 33
 nematodes on, 152, 156, 157
 permethrin on, 30
 pests of, 29–33
 root nodulation in, 156
 seasons and plant growth in, 30, 31
 Sitona lineatus on, 30, 33
 storage proteins from, 41
 virus diseases of, 28, 32
 Peat soils, cation-exchange capacity of, 230
Penicillium spp.
 on sugar beet roots, 76
 spore germination in, 191
Periplaneta americana (cockroach), effect of synergised pyrethroids on, 123
 Perithecia, from *Phialophora radicola* var. *radicola* isolates, 185
 Permethrin
 as an aphicide, 32
 degradation of, 135, 136
 for control of wheat bulb fly larvae, 127
 insect resistance to, 125
 on beans, 27
 on peas, 30, 32, 33
 Pesticide spray drops, deposition of, 168, 169
 Pesticides
 computer simulation of, 136
 leaching of in soil, 136
 microbial degradation of, 135, 136
 root penetration of, 135
 root uptake of, 135
 transport of in plants, 129
 See also: Aphicides; Fungicides; Insecticides; Nematicides
 Pests
 forecasting, 99, 100
 migrant, origins of, 98
 soil, on sugar beet, 69, 70
Phaseolus vulgaris
 ammonia assimilation in root nodules of, 37
 inoculation of with *Rhizobium*, 206
 Pheromone traps, for pea moths, 97, 98
 Pheromones
 alarm, in honeybees, 96, 97, 121, 126
 Nasonov pheromone, 97, 125, 126
 of *Ephestia kuehniella*, 126, 127
 of pea moths, orientation by, 97, 98
 queen pheromone, 97
Phialophora radicola var. *graminicola*, 36, 37, 184–186
Phialophora radicola var. *radicola*, 36, 37, 177, 184, 185
Phoma spp., on sugar beet, 75, 76
Phoma exigua var. *foveata* (gangrene on potato)
 effect of fungicides on, 196
 sources of inoculum, 194
 stolon infection, 194, 195
 Phoridae, ecological survey of, 266
 Phosphate, effects of concentration of on mycorrhizal infection, 203, 204
 Phosphate fertilisers
 deep incorporation of, 24
 for winter wheat, 250
 Phosphates, in leaves, estimation of, 51
 Phosphorus, soil
 association with crop yields, 266
 effect of mycorrhiza on, 251
 measurement of in soil biomass, 242, 253
 Photographic film, use of as a trapping surface, 177
 Photorespiration, 38
 Photosynthate, host, use of by fungus, 251, 252
 Photosynthesis
 by protoplasts and chloroplasts, 51
 effects of temperature on, 51
 in sugar beet, 70
Phytophthora spp., diagnostic keys for, 267
 Pigeon pea, nematodes on, 154
 Piperonyl butoxide, synergism by, 123
 Pirimicarb
 on beans, 27
 on sugar beet, 74
 on winter wheat, 17, 19, 21
 Plant material, ¹⁴C labelled, decomposition of, 253
 Plant physics, 165
 Plant water potential, 165
 Plant: weather interactions, 165
Plasmodiophora brassicae
 amino acids in, 132
 response of host to, 132
 Plum trees, bird repellents on, 130, 131
 Pollen, sampling of for heavy metals, 99
 Polyacrylamide gel electrophoresis, 41
 Polyethers
 monocyclic, 144
 open chain, 141, 144
 polycyclic, 145
 Polygalacturonase activity, 37
 Polypeptides
 of gliadin, 39, 40
 of hordein, 40, 41
 polymorphism of, 40
Polyscytalum pustulans (skin spot on potato), 196
 Potash, deep incorporation of, 24
 Potassium fertilisers
 adsorption of, 251
 residues, 251
 Potato Marketing Board, 176, 194
 Potatoes
 abscisic acid content of, 155
 aniline fungicides for, 195
 bactericides for, 176, 194
 blackleg on, 175, 193
 blight (*Phytophthora infestans*) on, 175
 calcium content of leaves, 155
 common scab (*Streptomyces scabies*) on, 132, 133, 195
 cyst nematode resistant varieties, 151, 155
 3,5-D on, 121
 diseases of, 175, 193–196
 dry rot (*Fusarium* spp.) on, 195, 196
 effect of lodging in, 59
 effect of organic matter on, 252, 253
 effect of soil P on yield, 266
 Erwinia caratovora var. *caratovora* (tuber soft rot) on, 193–195
 fungicides for, 196
 gangrene (*Phoma exigua* var. *foveata*) on, 194–196
 genetic manipulation of, 42
 growth of at Rothamsted and Woburn, 110
 King Edward, nematodes on, 151, 155
 mycorrhizal inoculation of, 251
 nematodes on, 150, 151, 156, 157
 on Broadbalk, 115
 pynidia on, 195
 radiation interception, 59
 skin spot (*Polyscytalum pustulans*) on, 196
 stem canker on, 195
 stolon infection, 194, 195
 tuber treatment before storage, 195, 196
 virus diseases of, 36
 water use, 155
 wound healing and storage diseases in, 195
 yields, 59, 60, 115
 Poultry experiments, 268
 Powder diffraction, 146
 Powys, soil survey in, 219
 Prochloraz
 as a fungicide on beans, 189, 190

INDEX

- Prochloraz (*contd.*)
as a fungicide on oilseed rape, 192
as a fungicide on potatoes, 196
Protease inhibitors, 36
Pr-proteins, relation of to virus resistance, 36, 176, 180, 181
Protein crystallography, 145, 146
Proteins
gluten, 39, 40
in cereal seed, 35
in potatoes, 36
leaf, extraction of, 258
pathogenesis related, 36, 176, 180, 181
storage, 35, 39, 42
synthesis of, 37, 40, 41
Protoplasts
photosynthesis by, 51
regeneration of plants from, 42, 43
Pseudomonas, in bacterial population on Little Knott, 207, 208
Pterostichus melanarius, as an aphid predator, 74
Pyracarbolid, as a fungicide on potato, 195
Pyrenopeziza brassicae (light leaf spot), effect of fungicides on, 192
Pyrethroids
antagonism by synergists, 123
aphid resistance, 125
effect on cockroaches, 123
effect of synergists on action of, 123
knock-down resistance to, 120, 121, 124, 125
structure-activity studies, 122, 123
Pyridoxal phosphate, inhibition of RuBP carboxylase from wheat with, 50, 51
Pythium spp.
on beans, 28
on sugar beet roots, 76
Quinalphos, on sugar beet, 69
8-quinolinol, as a bactericide for potatoes, 194
Quinones, 36
as urease inhibitors, 248
Radioactivity, natural, measurement of in soil, 251
Radish, cytoplasts from, 42
Rainfall, at Rothamsted and Woburn, 107, 108
Raintower experiments, 178
Red clover, diseases of, 187, 188
Redcurrants, bird repellents on, 130, 131
Repellents, bird, 130, 131
Resistance, to tobacco mosaic virus, 180, 181
Respirator filters, penetration of by actinomycete spores, 192
Rhizobium spp.
inoculation methods for *Phaseolus vulgaris*, 206
interactions with nematodes, on peas, 156
long-term storage of, 206
Rhizobium phaseoli, 206
Rhynchosporium secalis
effect of herbicides on, 186, 187
sensitivity to triadimenol, 134
splash-dispersed spores of, 178, 179
Rice, root-knot nematode on, 154
Rifampicin, use of in media for isolation of actinomycetes, 191
RNA fraction, of storage proteins, 41
Root disease, of field beans, 190
Roots, estimation of length of, 161
Rothamsted, weather at, 107, 108, 284
Rothamsted Insect Survey, 99, 182
Rothamsted *Rhizobium* Collection, 206
Royal Society for the Protection of Birds, 233
RuBP carboxylase/oxygenase, purification procedure for, 50
Ruminants, protein requirements of, 268
Ryegrass
aphids on, 95, 96
CO₂ compensation concentration of cultivars, 52
insect resistance in, 96
response to N fertilisers, 267
ryegrass mosaic virus, 188
Ryegrass (*contd.*)
seed-borne virus of, 187
See also: Grass crops
Saccharomonospora viridis, isolation of, 191
Salicylanilide, as a fungicide on potato, 195
Salters, in Lincolnshire, 224, 225
Samplers, liquid, for splash-dispersed diseases, 178
Saxmundham, weather at, 287
Scanning electron microscopy, for study of *Meloidogyne* spp., 160
Scottish Plant Breeding Station, 151
Scutigerella immaculata, on sugar beet, 69, 70
SDS-PAGE, 39–41
Seed storage proteins, 35, 39, 42
Seeds
methionine content of, 38
threonine content of, 38
wheat seed protein, 39, 40
Seepage, of water through aquifers, 171
Septoria spp., 22
Severn–Trent River Authority, 233
Sewage cake, for earthworm breeding, 102
Sewage sludge, toxic effects of heavy metals in, 254
Shirdley Hill Sand, mineralogy and weathering of, 258
Sitona spp., 27, 29, 30
Slugs
damage to sugar beet, caused by, 67, 69
seed treatments against, 128
Soil analysis, 259
Soil biomass
¹⁴C labelled, build-up of, 253
carbon in, 253
phosphorus in, 242, 253
Soil classification, 230
Soil maps, 212, 214, 219, 220, 230
Soil micro-organisms, physical studies on, 208, 209
Soil mineralogy, 256, 258
Soil moisture, See Soil water
Soil organic matter, See Organic matter
Soil origin, 257
Soil profile, for sugar beet, 72
Soil properties, spatial analysis of, 257
Soil sampling, survey of, 268, 269
Soil solutions, concentrations of copper and manganese in, 254, 255
Soil structure
characterisation and quantification of, 225–228
clay-water pressure, 172
computer analysis of, 225, 226
crumb porosity, 165
effects of subsoiling on, 26, 256
formation of, 255, 256
gaseous diffusion in soil crumbs, 169, 170
non-swelling soils, 173
overburden pressure, 172, 173
particle size, 230, 258
pore patterns, 227, 228
quantification of aggregates, 227, 228
swelling soils, 172, 173
total specific surface, 255
wetness, 228
Soil surveys
Bedfordshire, 214
Buckinghamshire, 214
Cambridgeshire, 214
Cumbria, 216
Dorset, 218
Durham, 216
Dyfed, 219, 222
East Anglia, 214, 215
Essex, 214, 215
Gloucester, 215
Gwent, 215
Gwynedd, 219
Hampshire, 217
Hereford and Worcester, 215
Isle of Wight, 217
Leicestershire, 216
Lincolnshire, 215, 224, 225

INDEX

- Soil surveys (*contd.*)
 - Midlands, 215, 216
 - Northamptonshire, 216, 232
 - North Yorkshire, 216
 - Powys, 219
 - Somerset, 218
 - Staffordshire, 215
 - Suffolk, 214, 215
 - Sussex, 217
 - Worcestershire, 215
- Soil temperature, 169
- Soil type
 - effect on yields of winter wheat, 247
 - interaction with liver fluke, 222, 224
- Soil water
 - effect on workability, 228
 - infiltration and run off, 171
 - ponding time, 171
 - potential, 26, 173
 - profiles, 170, 171
 - regimes, 231, 232
 - retention of, 232
 - scaling techniques for, 171
 - use by winter wheat, 246
- Soil workability, 228, 229
- Solanum* spp., diagnostic keys for, 266, 267
- Solanum berthaultii*, resistance to potato virus X in, 181, 182
- Solar radiation, measurement of at Woburn, 165
- Solute movement, in soil, 254
- Somerset, soil survey in, 218
- Sorghum, nematodes on, 154, 155
- Spatial analysis, of soil properties, 257
- Splash dispersal, mechanisms of, 177, 178
- Splash dispersed diseases, study of, 176, 178
- Splash droplet measurement, use of image analysis in, 177
- Splash mixing process, the, 177, 178
- Spores
 - actinomycete, 191, 192
 - deposition of, 168, 169
 - extraction of from soil, 161, 162
 - germination of, 191
 - gradients of dispersal, 179, 180
 - growth of 191
 - mycorrhizal, 202
 - of *Conidiobolus obscurus*, 208
 - of *Erysiphe graminis*, 168
 - of *Lycopodium*, 168
 - of *Rhynchosporium secalis*, 186, 187
 - splash-dispersed, 178, 179
 - transport of by wind, 179
- Sprayers
 - electrostatic, 166, 169
 - for small plots, 114
- Spraying
 - controlled drop application, 130
 - foliar, 129, 130
- Staffordshire, soil survey in, 215
- Statistical analysis
 - anthelmintic survey, 269
 - diagnostic key construction, 266, 267
 - for ADAS, 267–269
 - for ODA projects, 269, 274
 - National Milk Quality Survey, 269
 - of lacewings, 266
 - of livestock experiments, 267, 268
 - of nitrogen concentration in wheat grain, 265
 - of Phoridae survey, 266
 - of soil phosphorus and yields, 266
 - routine analysis, 269
 - Survey of fertiliser practice, 268
 - Survey of soils, 268, 269
 - taxonomy of cyst nematodes, 266
- Statistical models
 - for growth and yield of barley, 166, 167
 - for plant: weather interactions, 166
 - for soil-water physics, 166
- Statistical programming
 - documentation, 272
- Statistical Programming (*contd.*)
 - Generalised linear interactive modelling (GLIM), 273
 - Genkey, 266, 267, 272
 - Genstat, 266, 271–273
 - high-level languages, 273
 - Maximum likelihood program (MLP) 270, 272, 273
 - releases, 271, 272
 - Rothamsted General Survey Program (RGSP), 86, 273
 - time-series analysis 271, 272
- Statistical theory
 - asymmetry in multivariate analysis, 270
 - differential equations, 270
 - dual polyclaves, 271
 - estimation for generalised linear models, 271
 - intercropping, 274
 - non-linear inference, 270
 - ordination between and within groups, 269, 270
 - precision of data, 274
 - singular-value decomposition of matrix, 270
- Stomata, effect of ionophores on, 145
- Strawburning, effect on diseases of wheat, 183
- Streptomyces albus*, isolation of, 191
- Streptomyces scabies* (potato common scab)
 - control of by foliar sprays, 132, 133
 - effects on crop growth and yield, 195
- Suffolk, soil survey in, 214, 215
- Sugar beet
 - acephate on, 74
 - aphids on, 64, 72–75
 - area index, 70
 - assessment of leaf cover, 70, 71
 - auxin content, 59
 - beet mild yellowing virus, 176, 181
 - blackleg on, 67
 - carabid beetles on, 73
 - chalkland problems, 75, 76
 - damage by birds, 67
 - damage by hares, 67
 - damage by millipedes, 67
 - damage by slugs, 67
 - Docking disorder, 65, 150
 - dry matter production, 71, 72
 - effect of carbofuran, 66
 - effect of nitrogen and irrigation, 72
 - effect of soil P on yield, 266
 - effect of temperature on leaf development, 57, 58
 - ELISA test on, 65
 - Erysiphe betae* on, 65
 - Establishment Survey, 66, 67
 - fungi on roots of, 75, 76
 - germination in the field, 65
 - growth trials in the Yorkshire Wolds, 68
 - herbicides, 64
 - hormonal control of, 58, 59
 - indole- α -pyrone in, 59
 - infra-red photography of, 70
 - insecticide sprays for, 68, 69
 - leaf area index, 57, 58
 - Myzus persicae* on, 72, 73
 - nematodes on, 150, 151, 158
 - nitrogen requirement, 63
 - nitrogen uptake, 71, 72
 - plant establishment, 65–70
 - post emergence losses, 66
 - pre-emergence losses, 65, 66
 - radiation interception, 70, 71
 - Radopholus ritteri* on, 65
 - seed bed irrigation, 66
 - seedling damage, 70
 - seedling establishment, 65, 66
 - soil insecticides for, 67, 68
 - soil pests on, 69, 70
 - soil profile for, 72
 - soluble impurities in the root, 72
 - sugar yields, 72, 76
 - superphosphate on, 75
 - time and method of nitrogen application, 67
 - trials on the Fens, 69

INDEX

- Sugar beet (*contd.*)
 variation between rows, 66
 variation in seedling weight, 66
 virus diseases of, 65, 73–75
 weed beet, 64
 wood mouse damage to, 64
 Sugar beet establishment survey, 66, 67
 Sulphate, estimation of, 231
 Sulphur, in plastic drainage pipes, 257
 Surveys, *See* Rothamsted Insect Survey; Statistical analysis; Sugar beet establishment survey.
 Sussex, soil survey in, 217
 Syrphid larvae, on sugar beet, 74
- Take-all on cereals
 after grass crops, 185, 186
 anatomical studies of in lesioned tissue, 207, 208
 benomyl for control of, 133
 decline, 207, 208
 effect of breaks on, 184
 effect of nuarimol on, 133
 effect on yields, 243, 246
 lesions, 37
 microbiology of wheat roots infected with, 207, 208
 origin of, 184
 studies of a low-infectivity site, 184
See also: Gaeumannomyces graminis
- Taro, nematodes on, 155
 Technicon AutoAnalyzer, 259
 Temperature, effects of on photosynthetic and photo-respiratory metabolism, 51
 Tensiometers, 172
 Thames Water Authority, 101, 233
 Thermal conductivity, effect of tillage on, 166, 169
 Thiabendazole
 as a fungicide on beans, 189
 as a fungicide on potatoes, 196
 Thiophamine, on potatoes, 196
 Thiophanate methyl, on potatoes, 196
 Thiram, on beans, 190
 Thrips
 on cereals, 129
 stylet apparatus in, 92
 Tillage experiments, 166, 169
 Time response, theory of, 172
 Tissue cultures, from wheat and barley, 43
 Tobacco
 Pr-proteins in tobacco callus tissue, 176, 180
 virus diseases of, 176, 181
 Tomatoes, nematodes on, 150
 Toxicity
 of heavy metals in sewage sludge, 254
 of trace metals, 254, 255
 zinc equivalent index of, 254
 Trace elements, determination of migrant pest origins by, 98
 Trace metal programme, 242
 Traffability, maps showing, 233
 Transducer technique, to measure stem diameter, 165
 Transmission, of viruses, 187, 188
 Traps
 for *Rhynchosporium secalis* spores, 178, 179
 pitfall traps, 74
 sticky traps, 74
 suction traps, 183
 water traps, 74
See also: Insect traps
 Triadimefon
 on rape stubble, 192, 193
 residual effect of, 186
 Triadimenol, response of barley pathogens to, 134
 Tridimorph
 mode of action of, 134
 on winter barley, 23, 130
Trifolium repens, *See* Clover
- University of Wales experimental farm, 71
 Upper Greensand soils, 217, 218
 Urea, aqueous, 248, 249
- Urease inhibitors, 249
- Vectors
 putative, of red clover necrotic mosaic virus, 188
 specificity of isolates introduced by infective aphids, 183
Venturia canescens, 121, 127
Verticillium
 on ripening grain, 190
 on winter wheat, 22, 23
Verticillium chlamydosporium, 159, 161, 162
 Vesicular-arbuscular mycorrhiza, *See* Mycorrhiza
- Viruses
 aphid infectivity, 182
 enzyme-assisted extraction of, 181
 helper, 189
 hypersensitivity, 36
 interactions with aphids, 182, 189
 of beans, 188–190
 of cereals, 181–182
 of grasses, 187
 of honeybees, 93, 94
 of legumes, 187–189
 of peas, 189
 of potatoes, 181, 182
 of sugar beet, 65, 73–75, 176
 of tobacco, 36, 176, 181
 properties of, 180–182
 purification of, 181
 resistance to, 176, 180, 181
 serological relationships of, 181
 transmission by *Myzus persicae*, 125
- Viruses, names of,
 acute bee paralysis virus, 94
 Arkansas bee virus, 94
 barley yellow dwarf virus, 22, 92, 93, 175, 176, 181–183
 bean leaf roll virus, 27, 28, 32, 189
 bean yellow vein-banding virus, 189
 bee filamentous virus, 94
 bee virus Y, 93
 beet cryptic virus, 181
 beet mild yellowing virus, 176, 181
 beet yellows, 65, 72, 73
 black queen-cell virus, 93
 cauliflower mosaic virus, 42
 chronic bee paralysis virus, 93, 94
 Kashmir bee virus, 94
 pea early-browning virus, 32, 189
 pea enation mosaic, 28, 32, 189
 potato virus X, 36, 181, 182
 potato virus Y, 182
 red clover necrotic mosaic virus, 187, 188
 red clover vein mosaic virus, 32
 ryegrass mosaic virus, 187
 ryegrass seed-borne virus, 187
 sacbrood virus, 94
 tobacco mosaic virus, 36, 176, 180, 181
 vicia cryptic virus, 188, 189
- Visitors, 116
- Water activity, for spore germination, 191
 Water Research Centre, the, 101
 Water stress
 response of spring barley to, 167
 role of proline in, 39
- Weather
 at Broom's Barn, 286
 at Rothamsted, 284
 at Saxmundham, 287
 at Woburn, 285
- Wheat
 absorption of pheromone by leaves, 98
 aldicarb on, 17, 19
 at Broom's Barn, 76
 at Rothamsted and Woburn, 108, 109
 baking quality of flour, 39, 40
 concentration of nitrogen in grain, 265, 266
 direct drilling of, 116, 183
 diseases of, 246

INDEX

- Wheat (*contd.*)
 ear dry weight, 18, 19
 effect of early sowing, 17, 18
 effect of earthworms on, 101
 effect of glume removal, 55
 effect of irrigation on, 17, 19
 effect of organic matter on, 252, 253
 effect of soil type on yields, 247
 effect of subsoiling on, 116
 eyespot on, 183
 fungicides for, 133, 176
Fusarium on, 183
 grain size, 54
 grain yield, 17
 growth of grain in cultured ears, 55, 56
 Highbury, 55, 56
 Hobbit, 55
 Hustler, 55
 indoleacetic acid in grains of, 55
 inoculation with mycorrhiza, 251
 late sowing, 17, 18
 leaf area index, 18, 19
 leaf senescence, 19
 microflora of developing ears, 22, 23
 nematodes on, 21, 150, 153, 154
 nitrogen in soil, 245
 nitrogen in stems, 245
 nitrogen, 17–20, 53, 54
 nitrogen uptake, 245, 246
 nutrient uptake rate, 246
 pests of, 100
 phosphorus fertilisers for, 250
 pirimicarb on, 17, 19
 pre-harvest sprouting of, 55
 recovery of ^{15}N labelled fertiliser by, 247, 248
 root samples from, 17
 seed protein in, 39, 40
 seed rates for, 116
Septoria on, 175
 Sicco, 55, 56
- Wheat (*contd.*)
 soil water use, 246
 strawburning, 183
 sulphur-deficient grain, 39
 take-all on, 184–186, 207, 208
 tiller number, 18, 19
 timing of N for, 267
 virus-infected, *Cladosporium* spp. on, 93
 winter wheat modelling, 246, 247
 winter, yields of, 242–245
See also: Cereals; *Gaeumannomyces graminis*;
 Take-all
- Wheat bulb fly
 control of larvae, 127
 elemental analysis of, 98
 forecasting, 100
- Wiltshire, soil survey in, 218
- Wind, transport of spores by, 179
- Wireworms, on sugar beet, 69
- Woburn Farm
 barley on, 109, 110
 beans on, 110
 direct drilling experiment, 108
 livestock on, 111
 measurement of solar radiation at, 165
 nitrogen in soils at, 245, 246
 oats on, 110
 pea early-browning virus at, 189
 potatoes, 110, 111
 take-all at, 184
 wheat on, 108, 109, 243–245
- Worcestershire, soil survey in, 215
- Wye College, 116
- Yeasts, on ripening grain, 190, 191
- Yield variation programme, 242, 243
- Yorkshire Wolds, sugar beet trials on, 68
- Zinc equivalent index, of metal toxicity, 254