

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 1979 - Part 1

[Full Table of Content](#)



---

## Index

### Rothamsted Research

Rothamsted Research (1980) *Index* ; Report For 1979 - Part 1, pp 277 - 286 - **DOI:**  
<https://doi.org/10.23637/ERADOC-1-136>

## SUBJECT INDEX

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

- A* concept, 191  
*Abacarus hystrix*  
transmission of agropyron mosaic virus by, 173  
transmission of ryegrass mosaic virus by, 174  
Abscisic acid, effect of benzo-18 crown-6 on, 135  
Acetylcholinesterase, organophosphate insensitive, 115  
Acetylene blocking technique, 227  
Acid brown soils, 213, 214  
*Actinomadura*-like isolates, numerical taxonomy of, 169  
Adenosine 5'-triphosphate, measurement of in soil, 234  
Aerosols, deposition of, 160, 161  
Agricultural meteorology, 160-162  
*Agropyron repens* (couch grass)  
in grass, 99  
on Broadbalk, 52  
virus disease of, 173  
*Agrostis gigantea* (bent couch) on Broadbalk, 52  
Aldicarb  
as aphicide, 21  
effect on mycorrhiza, 189  
effect on nematodes, 20, 145, 146  
effect on *Trifolium repens*, 189  
on sugar beet, 58, 88  
on winter wheat, 18, 87  
to control *Sitona* on peas, 85  
toxic metabolite of, 124, 125  
uptake of into earthworms, 125  
'Aliette' (fosetyl)  
as a fungicide, 170  
on lupins, 175  
Alkali metals, co-ordination chemistry of, 131-134  
Alkaline earth metals, co-ordination chemistry of, 131-134  
*Allolobophora caliginosa*, 89  
*Allolobophora chlorotica*, 89  
*Allolobophora longa*, 89  
Allophane, deposition of in field drains, 236, 237  
Allophanic soils, kinetics and enthalpy of phosphate adsorption on, 229  
Allyl isothiocyanate, effect on *Pyrenopeziza brassicae*, 177  
*Alopecurus myosuroides* (blackgrass), on Broadbalk, 51, 52  
*Alternaria* spp., 22  
fungicidal control of, 169  
Amino acids  
aminoethylcysteine, 31  
biosynthesis of, 30  
cysteine, 30, 34  
in hordein fraction, 31  
isoleucine, 30  
leucine, 33  
methionine, 30  
threonine, 30, 31  
Ammonia, assimilation of, 27, 29, 30  
reassimilation of, 27, 29, 30  
Ammonium, soil analysis for, 239  
Ammonium-oxidising bacteria, 194  
Anthelmintics, survey of, 249  
Antibiotics, for control of Sumatra disease of cloves, 170  
Aphicides  
acephate, 63, 64  
demephion, 63  
demeton-S-methyl, 63  
ethiofencarb, 63  
Aphicides (contd.)  
'Hoe 25682', 63  
pirimicarb, 63  
resistance to, 115, 116  
See also: Insecticides; Pesticides  
*Aphidius uzbekistanicus*, 85, 88  
Aphids  
alarm pheromones in, 116  
bulletins, 82  
entomophagous fungi for, 81  
genetic variability of populations, 85  
hyperparasites of, 88  
identification of parasites of, 80, 81  
insecticide resistance in, 80, 85, 110, 111, 115, 116  
migration of, 82  
monitoring of, 81-83  
on beans, 98  
on cereals, 20, 21, 82, 83, 85, 87, 88, 116  
on sugar beet, 56, 62, 63, 82  
parasites of, 85, 86, 88  
parasitoids of, 88  
pirimicarb for, 81  
population thresholds for, 80  
predators of, 87, 88  
transmission of barley yellow dwarf virus by, 173, 174  
trapping of on *Solanum berthaultii*, 180  
Aphids, names of,  
*Aphis fabae*, 56, 63, 64, 82, 98  
apple-grass aphid, 81  
*Brevicoryne brassicae*, 82  
hop aphid, 81  
*Macrosiphum avenae*, 173  
*Macrosiphum euphorbiae*, 82  
*Metopolophium dirhodum*, 20, 21, 82, 83, 87, 88, 97, 116  
*Myzus persicae*, 56, 62, 63, 81, 82, 110, 115, 116, 180, 181  
peach potato aphid, 111  
*Rhopalosiphum padi*, 20, 81, 82, 173  
*Sitobion avenae*, 20, 82, 85, 87, 88, 116  
*Sitobion fragariae*, 82, 85  
ARC Letcombe Laboratory, 119  
Arthur Rickwood Experimental Husbandry Farm, 145, 236  
*Aspergillus glaucus* group, tolerance of propionic acid by, 125, 169  
*Atomaria linearis*, damage caused by, in sugar beet, 59, 88  
Atomic absorption spectrophotometer, 238  
Atomisers, rotary, 120  
Auxanometers, 153, 154, 159  
Avon Universities Computer Centre, 74  
*Azotobacter* spp., in forced association with *Glomus caledonius*, 190  
*Azotobacter chroococcum*, in mixed inocula with VA mycorrhiza, 189  
'Banlene Plus', 96  
Barley  
effect of atmospheric pollution on growth of, 40  
effect of defoliating on, 173  
effect of drought on grain size, 160  
effect of drought on yield, 159, 160  
effect of irrigation on, 97  
effect of rainfall on, 225, 226  
effect of silicate on, 103-105



## INDEX

- Barley (contd.)**  
effect of soil organic matter on yields, 234, 235  
*Erysiphe graminis* on, 122–124, 161  
fluoride concentration in, 40  
genetic manipulation of, 34  
glutelins of, 31, 32  
grain size, 42  
grain yields, 40  
growth of in open-topped chambers, 40  
hordein fraction of, 31–34  
infection of roots by minor pathogens, 170  
inoculation of with VA mycorrhiza, 186, 187  
irrigation of, 97, 98  
lodging of, 40  
malting quality of, 34  
model for translocation of carbon in, 246  
permanent, on Hoosfield, 102, 103  
*Rhynchosporium secalis* on, 166, 168  
take-all on, 171, 172  
translocation of carbon in, 246  
variety experiment, 98  
yields, 40, 97, 98, 102, 103  
*See also: Cereals; Erysiphe graminis; Take-all*
- 'Basamid', as a nematocide, 186**
- Beans (*Vicia faba*)**  
aphids on, 98  
*Botrytis fabae* (chocolate spot) on, 98, 176  
diseases of, 175, 176  
effect of weather on, 98  
effects of silicate on, 104, 105  
foliar fertilisers on, 191  
herbicides for, 98  
nodulation and nitrogen fixation by, 191  
*Phytophthora megasperma* on, 166, 175, 176  
*Sitona* spp. on, 84, 191, 192  
stem nematodes on, 145, 146  
vicia cryptic virus, 176  
yellow mosaic virus of, 176  
yields, 98  
*See also: Phaseolus vulgaris*
- Bees, See Honeybees**
- Beetles**  
*Agonum dorsale*, 89  
as *Sitona* predators, 89  
*Bembidion lampros*, 89  
carabid, as aphid predators, 88  
carabid, on sugar beet, 59, 62, 63  
pea and bean weevils, 80  
*Pterostichus madida*, 89  
*Pterostichus melanarius*, 89  
pygmy mangold beetles, 81, 88  
*Sitona* spp. 84, 85, 89, 191, 192  
staphylinid, as aphid predators, 88  
staphylinid, on sugar beet, 59
- 'Benlate T', on lupins, 175**
- Benomyl**  
effect on chocolate spot, 176  
for control of clover rot, 174  
for control of microflora of ripening grain, 169
- Biological species concept, application of to nematodes, 140**
- Bioresmethrin**  
effect on houseflies, 113  
selectivity of, 118
- Birds, repellents for, 120**
- Blackgrass. See *Alopecurus myosuroides***
- Botrytis fabae* (chocolate spot), on beans, 98, 176**
- Brassica crops, diseases of, 177**
- British Sugar Corporation, 56, 61, 249**
- Broadbalk**  
Classical experiments on, 102, 103  
wheat on, 96
- Broom's Barn Farm**  
cereal yields at, 22, 68  
livestock, 65, 68  
policy review, 64  
rotations at, 65  
soil surveys at, 216  
sugar yields at, 56  
weather at, 56, 266
- Cabbage**  
Clubroot (*Plasmodiophora brassicae*) on, 121, 122, 177  
<sup>14</sup>CO<sub>2</sub> fixation by healthy plants, 177  
fungicides for treatment of, 121  
growth regulators for control of, 121, 122  
stomatal resistance of, 177
- Calimeter, field, 214**
- Calcium, role of in hatching of cyst nematodes, 143**
- Captafol, on wheat, 169**
- Carbendazim**  
harmful effect on earthworms, 89  
to control gangrene in potato, 179
- Carbinol analogues, effect on housefly nervous system, 113**
- Carbon, translocation of in barley, 246**
- Carbon dioxide enrichment, effect on growth and yield of spring wheat, 42, 43**
- Carboxylation effect of carbonic anhydrase on rate of, 44, 45**
- Central Veterinary Laboratory, 215**
- Cereals**  
ADAS fertiliser recommendations for, 246, 247  
aphids on, 82, 83, 85  
effect of atmospheric pollution on, 40  
effect of drought on, 159, 160  
effect of irrigation on, 98  
effect of rainfall on, 225, 226  
effect of soil organic matter on yields, 234, 235  
*Erysiphe graminis* on, 25, 122, 123, 161  
fungal infections of, 122, 169  
fungicides for, 122  
grain size, 41, 42  
role of actinomycetes in deterioration of, 169  
slugs in, 118, 119  
storage proteins in, 31–34  
take-all on, 171, 172  
virus diseases of, 173  
*See also: Barley; Erysiphe graminis; Maize; Oats; Take-all; Wheat*
- Chalkland soils, origin of, 237**
- Chemical Defence Establishment, 161**
- Chenopodium* spp., virulence of crimson clover latent virus to, 174, 175**
- Chloridazone (formerly pyrazone) on sugar beet, 58**
- Chlorine dioxide, for seed treatment of potatoes, 178**
- Chlormequat, on winter wheat, 17**
- Chloroplasts**  
glutamine synthetase in, 31  
threonine-sensitive enzyme in, 30
- Chlortoluron, 96**
- Chocolate spot (of beans). See *Botrytis fabae***
- Chromium (VI), behaviour of in soil, 232**
- Cladosporium* spp.**  
fungicidal control of, 169  
on developing wheat ears, 22
- Clay minerals**  
cation exchange sites in, 230  
differential enthalpy of, 230  
K-Ca exchange in, 230  
*See also: Soil mineralogy*
- Clover**  
cyst nematodes on, 143  
effect of aldicarb on, 189  
effect of mycorrhizal inoculation on, 186  
nematodes on, 189  
*Sclerotinia* rot of, 174  
spread of mycorrhizal endophytes in, 187  
*See also: red clover*
- Cloves, Sumatra disease of, 170**
- Cockroach (*Periplaneta americana*), neuroanatomy of, 112, 113**
- Coconuts**  
a disease of, 169–170  
mass pollination of, 120
- Colletotrichum coccodes* (black dot), on potato, 179**
- Colombo Plan Technical Cooperation Scheme, 253**
- Computer programs**  
DLRED, 137



## INDEX

- Computer programs (*contd.*)  
 for Soil Survey, 214, 215  
 G-EXEC, 74, 214  
 GHOST, 75, 137  
 languages, 75, 76  
 MAGIC, 137  
 MULTAN, 137  
 ORTEP, 137  
 Rothamsted General Survey Program, 75  
 YZARC, 137  
*See also:* Statistical programming
- Computers  
 applications, 74, 75  
 CDC 7600, 252, 253  
 computer graphics, 75  
 concentrators, 76  
 data management, 74, 157  
 front end processor, 74–76  
 hardware failure, 73  
 IBM 1130, 137  
 ICL System 4–70, 72, 73, 157, 160, 214, 215, 235  
 ICL System 4–72, 72, 73  
 management services section, 77  
 microprocessors, 160  
 model for growth of winter wheat, 227  
 model for soil crack patterns, 235  
 networks, 75  
 operations section, 72–74  
 PDP 8, 137  
 policy, 72  
 Prime 300, 76  
 remote concentrators, 76  
 system performance, 73, 74  
 telecommunications section, 75  
 training, 75  
 utilisation by institutes, 73  
*See also:* Computer programs; statistical analysis; statistical programming
- Conington Fen, peat soils in, 210–212  
 Controlled drop application of pesticides, 120  
 Coordination chemistry, of alkali and alkaline earth metal cations, 131–134  
 Copper complex formation, by organic matter, 231  
 Cornwall, soil survey in, 202–204  
 'Cosmic', on winter wheat, 18, 21  
 Cowpea, interaction of variety and environment in, 254  
 Crop patterns, on air photos, 208–210  
 Crown ethers, reduction of, 131  
 Crystal structure determinations, 134, 135  
 Cypermethrin, crystallisation of, 135
- 2,4-D, as a growth regulator, 121  
 3,5-D, as a growth regulator, 121, 122  
 Daminozide, action of against potato scab, 110  
 Dark respiration, in spring wheat, 43, 44  
 DDT, housefly resistance to, 113, 114  
 'Delsene M', on wheat, 169  
 Denitrification, measurement of in soils, 227  
 Devon, soil survey in, 203  
 Diazinon, degradation of in soil, 125  
 Dichlorophen, activity of against *Erwinia carotovora*, 178  
*See also:* 'Telone'
- Dieldrin, poisoning of honeybees by, 117, 118  
 Difenoquat, 97  
 Diffusion, of gaseous plumes, 162  
 Direct drilling, effect on soil organic matter, 233  
 Drought experiments, 153, 159, 160  
 Dyfed, soil survey in, 205
- Earthworms, 81  
 effect of direct drilling on, 89, 90  
 effect of fertilisers on, 89, 90  
 effect of strawburning on, 89, 90  
 on sugar beet, 59  
 uptake of pesticides into, 125  
 East Anglia, soil survey in, 200, 216
- EEC, Insect Survey in, 80  
 Electrophoresis, identification of aphid parasite species by, 80, 81, 85  
 Electrothermal atomisation, 238  
*Endogone*, effect of new fungicides on, 170  
 Entomophagous fungi, for control of aphids, 81  
*Entomophthora* spp.  
 on sugar beet, 63  
 spores of, 193  
*Entomophthora aphidis*, 87  
*Entomophthora planchoniana*, 87  
 Enzyme-linked immunosorbent assay for barley yellow dwarf virus, 173
- Enzymes  
 acetylcholinesterase, 115  
 aspartate kinase, 30  
 carbonic anhydrase, 44  
 cell-wall degrading, 29  
 cyanide-resistant oxidase, 44  
 cyanide-sensitive cytochrome oxidase, 44  
 glutamate dehydrogenase, 30, 31, 193  
 glutamate synthase, 30, 31  
 glutamine synthetase, 30, 31  
 homoserine dehydrogenase, 30  
 lipoygenase, 46  
 nitrogenase, 30  
 respiratory, in take-all lesions, 193  
 RuBP carboxylase, 39, 44, 45  
 saccharopine dehydrogenase, 31  
 succinate dehydrogenase, 193  
 use in identification of *Sitobion* species, 85
- Ephestia kuehniella*  
 pheromones from, 111, 117  
*Erwinia carotovora*, on potatoes, 178  
*Erysiphe betae*, control of, 64  
*Erysiphe graminis* (barley mildew)  
 action of hydroxypyrimidine fungicides on, 122–124  
 at Rothamsted and Woburn, 97  
 controlled droplet application for control of, 120  
 deposition of spores of, 161  
 Essex, soil survey in, 200  
 Ethiofencarb, effect on beet yellow virus, 116  
 Ethionine, action on potato common scab, 110  
 Ethirimol, 98, 122, 123  
 Eyespot (*Pseudocercospora herpotrichoides*) on wheat, 122, 166
- Farmyard manure, on sugar beet, 65  
 Farnesene, preparation of, 116  
*Fasciola hepatica* (liver fluke) distribution of host of, 215  
 Fatty acids, microbial degradation of, 125  
 Fenugreek (*Trigonella foenum-graecum*) inoculation of with *Rhizobium*, 106  
 Fenvalerate, selectivity of, 118  
 Ferrihydrite, deposition of in field drains, 236
- Fertilisers  
 effect of PK fertilisers on take-all, 172  
 foliar, on field beans, 191  
 for cereals, ADAS recommendations for, 247  
 organic, effect on earthworms, 89  
 Survey of Fertiliser Practice, 248  
*See also:* Nitrogen fertilisers; Phosphate fertilisers; Potassium fertilisers
- Fescue, spread of VA mycorrhizal endophytes in, 187  
 Field beans. *See* Beans  
 Field drains, deposition of ochre in, 236, 237  
 Field experiments, statistical analysis of, 249  
*Flavobacterium* sp. a, isolation of from soil, 125  
 Fluid drilling, of mycorrhizal inoculum, 187  
 Fluometuron, leaching of, 119  
 Fluoride, concentration of in barley plants, 40  
 Fonofos, to control cereal aphids, 88  
 Fosetyl, 170  
 Fulvic acid, in field drains, 237  
 Fungal spores. *See* Spores  
 Fungi, as parasites of cyst nematodes, 146  
*See also:* Mycorrhiza



- Fungicides**  
 effect on survival of lupins, 175  
 for control of clubroot, 121  
 for control of potato storage fungi, 126  
 for microflora of ripening grain, 169  
 for soil-borne diseases of wheat, 122  
 hydroxyprimidine, mode of action of, 122-124  
 new, effects on infections of barley roots, 170  
 use of against tuber-borne pathogens, 178, 179  
*See also:* names of chemicals used as fungicides
- Fungus diseases**  
 clover rot, 174  
 clubroot (*Plasmodiophora brassicae*), 177  
 of cereals, 122, 169  
 of potatoes, 178-180  
*Septoria*, 21  
*See also:* *Erysiphe*; Eyespot; *Fusarium*; Take-all
- Fusarium* spp.**  
 fungicidal control of, 122, 169  
*Fusarium culmorum*, 122  
*Fusarium nivale*, 122  
*Fusarium solani*, 179  
*Fusarium sulphureum*, 179  
 on beans, 175
- Gaumannomyces graminis***  
 infectivity of lesions, 193  
 on wheat at Rothamsted, 97  
 var. *tritici*, 171  
 var. *graminis*, 171  
*See also:* Take-all
- Gaumannomyces*—*Phialophora* complex**, 29, 166  
 anamorphs and telomorphs of, 171  
*Gallionella ferruginea*, 237  
 Gas chromatography—mass spectrometry  
 examination of water-cress by, 49  
 for identification of auxin in sugar beet, 48, 49  
 for identification of gibberellins in developing wheat grain, 46  
 Genetic manipulation, 27  
 Gibberellins. *See* Growth substances  
 Glasshouse Crops Research Institute, 81  
*Glomus calodontis*, 186-190  
*Glomus fasciculatus*, 186  
*Glomus mossae*, 189  
 Glucosinolate, for control of clubroot, 121  
 Glyphosate, 96  
 Grass  
*Agropyron repens* in, 99  
 ryegrass mosaic virus, 174  
 Grazing classification, of soils, 214  
 Growth substances  
 abscisic acid, 45  
 auxin, 48, 49  
 benzyl adenine, 45  
 2,4-D and 3,5-D, 121, 122  
 effect on wheat grain set, 45  
 endogenous, in wheat, 45  
 ethephon, 45  
 gibberellic acid, 45, 46, 144  
 gibberellins, 45, 46  
 in developing wheat grain, 46  
 indoleacetic acid, 45, 48, 49  
 indoleacetic hydrochloride, 144  
 naphthaleneacetic acid, 45  
 phenylacetoneitrile, 49  
 Guanidinium nitrate, crystalline complex formed from, 135  
 Gwynedd, soil survey in, 204  
 Hampshire, soil survey in, 200  
 Hay, damp, chemical preservation of, 169  
 moulding of, 125  
**HCH**  
 on sugar beet, 58, 59  
 poisoning of honeybees by, 117, 118  
*Helminthosporium solani* (silver scurf) on potato, 179, 180
- Herbicides**  
 2,4-D, 121  
 growth-regulating, 121  
 leaching of, 119  
*See also:* names of chemicals used as herbicides
- Herfordshire, soil survey in**, 201  
 (Z)-11-Hexadecenyl acetate, 117  
 Hill pastures, effects of mycorrhiza on white clover establishment in, 186  
 Holme Fen, peat soils in, 210-212  
 Home-Grown Cereals Authority, 33  
 Honeybees (*Apis mellifera*)  
 alarm pheromone for, in insecticidal sprays, 87  
 electro-antennographic responses of to Nasonov components, 86  
 Nasonov pheromone, 86, 117  
 pheromones of, 81, 86  
 poisoning of by pesticides, 81, 86, 118  
 queen pheromones of, 86, 87  
 Hoosfield  
 barley on, 96  
 classical experiments on, 102-105  
 Hops, aphid control in, 81  
 Hordeins, genetic analysis of, 32, 33  
 Horetail (*Equisetum arvense*) on Broadbalk, 52  
 Housefly (*Musca domestica*)  
 effect of carbinal analogues on, 113  
 effect of PPP on, 115  
 effect of pyrethroids on, 111  
 effect of 'Reslin 10' on, 114  
 insensitive acetylcholinesterase in, 115  
 knock-down resistance in, 113, 115  
 pen factor in, 115  
 resistance of to insecticides, 111, 114, 115  
 Humidity sensor, calibration of, 160  
 8-Hydroxyquinoline, for seed treatment of potatoes, 178
- Imazalil**  
 effect on *Alternaria*, 169  
 effect on ganarene in potatoes, 179  
 for ware treatment of potatoes, 126, 179  
 Immunodiffusion tests, with hordein, 31  
 Inoculum  
 effect on take-all in barley, 171  
 mycorrhizal, production of, 188  
 Insect traps  
*Atomaria linearis* caught in pitfall traps, 59  
 pheromone traps for diamond back moth, 84  
 pheromone traps for pea moth, 83, 245, 246  
**Insecticides**  
 aphid resistance to, 111  
 bioassay of with onion fly, 121  
 bird repellents, 120  
 formulations, 120  
 housefly resistance to, 111, 113-115, 121  
 leaching of, 119  
 microencapsulation, 120  
 organophosphate, 115  
 poisoning of honeybees by, 117, 118  
 selectivity of to different insect species, 118  
 slug-repellents, 118, 119  
*See also:* Aphicides; Pesticides; pyrethroids; names of individual insecticides.
- Insects**  
 action of insecticides on nerves of, 112, 113  
 neuroanatomical techniques for, 114  
 neuroanatomy of, 113  
 rearing of, 120, 121  
 X-ray fluorescence spectrometry for analysis of, 238  
*See also:* Insect traps; name of individual insects.
- International Institute of Tropical Agriculture, Nigeria**, 254  
 International Organisation for Biological Control, 81, 88

INDEX



- Mycorrhiza (cont.)**  
 effect on plant growth and internal P concentration, 229  
 effect on soil phosphorus, 229  
 effect on white clover in hill pastures, 186  
 factors affecting spread of endophytes, 187, 188  
 fluid drilling of, 187  
 growth of from spores, 189  
 inoculation of barley with, 185, 186  
 inoculation techniques for, 187  
 models for spread of infection on roots, 229, 230  
 nutrient film technique for, 185  
 sensitivity of to added phosphate, 186  
 with *Azotobacter* in mixed inocula, 189, 190
- National Coal Board, 212, 213  
 National Grassland Trial, 247  
 National Research Development Corporation, 185  
 Natural Environmental Research Council, 74  
 Natural oil, antifungal activity of, 170, 171
- Nematodes**  
 application of biological species concept to, 140  
 behaviour of bovine lung-worm, 148  
 cyst nematodes, 143-147  
 dormancy in, 144  
 effect of soil temperature on, 148  
 effect of temperature on morphology of, 142  
 egg-shell permeability and hatching of pig roundworm, 148  
 electrophoresis of stem nematode races, 140, 141  
 films of, 148, 149  
 fine morphology of spiral and stunt nematodes, 141, 142  
 fungal parasites of cyst-nematodes, 146  
 gene flow between species, 140  
 genes for resistance to potato cyst nematodes, 144  
 hatching of, 143, 144  
 hybridisation studies with, 140  
 micro-organisms associated with, 147  
 morphology and taxonomy of, 140  
 morphology of potato cyst-nematodes, 142  
 morphometric formulae for feeding pumps of, 142, 143  
*Nematophthora gynophila*, on, 66, 146  
 new records of, 143  
 on potatoes, 99  
 on sugar beet, 65, 66  
 on winter wheat, 20  
 on *Trifolium repens*, 189  
 pathotypes of potato cyst nematodes, 144, 145  
 population changes in cyst nematodes, 146  
 population model for cyst nematodes, 246  
 separation of potato cyst nematode species, 142  
 spear bearing, 20  
 trehalose in eggs of, 148  
 ultrastructure of sperm, 141  
 use of basamid and telone on, 186  
 virulent genotypes of potato cyst-nematodes, 144, 145
- Nematodes, scientific names of**  
*Amplimerlinus*, 142  
*Aphelenchina*, 141  
*Ascaris suum*, 148  
*Dicryocaulus viviparus*, 148  
*Ditylenchus dipsaci*, 140, 141, 145  
*Geoceanus longus*, 143  
*Globodera pallida*, 140, 142, 144  
*Globodera rostochiensis*, 99, 140, 142, 143, 144, 145  
*Globodera solanacearum*, 140  
*Globodera virginiae*, 140
- Ionophores, effect on stomata, 135**  
 Iprodione, for control of clover rot, 174  
 Irrigation  
 back, drains used for, 236, 237  
 effect on chocolate spot of beans, 176  
 effect on winter wheat, 40  
 Isle of Wight, soil survey in, 202
- John Innes Institute, 186  
 Kriging, 215  
 Leaching  
 of nitrate in soil, 235, 236  
 of pesticides in soil, 119, 124, 125  
 Leaf chamber calibration, 160  
 Leaf protein  
 juice extractor for, 238  
 preservation of, 238
- Legumes**  
 gram, diseases of, 175, 176  
 symbiotic nitrogen fixation in, 185  
 virus diseases of, 174-176  
*See also: Clover; Cowpea; Lucerne; Lupins*  
 Lincinshire, soil survey in, 200, 201  
 Little Knott, data acquisition system for, 157  
 Livestock  
 at Rothamsted and Woburn, 99  
 statistical analysis for, 246-248  
 Long Ashton Research Station, 120  
 Lucerne  
 growth of in soil inoculated with VA mycorrhiza, 188  
 stem nematodes on, 145, 146  
*See also: Legumes*  
*Lumbicus terrestris*, 89  
 Lupins, frost susceptibility of, 175  
*Lycopodium* (club moss), deposition of spores of, 161  
*Lymanea truncatula*, habitats of, 215  
 Macrobiocyclic molecules, 131  
 MAF Plant Pathology Laboratory, 81  
 Maize  
 gliuelins of, 32  
 growth of in soil inoculated with VA mycorrhiza, 188  
 nitrogen fertilizer for, 105, 106  
 stem nematodes on, 145, 146  
 use of for mass inoculum production, 188  
 Malaysia, agricultural research in, 253  
 Managoczeb, on potatoes, 99  
 Manganese, for sugar beet, 62  
 Mapping programme, 1:25,000, 205, 206  
 Maps, soil, 198-206  
 Mercury porosimetry, 238  
 Metaldelyd, on winter wheat, 87  
 Methiocarb, effect on slugs, 118, 119  
 Methyl bromide, to sterilise soil for sugar beet growing, 66, 67  
 Micromorphometry of soils, 214  
 Micronutrients, 231-233  
 Midlands, soil survey in, 200, 201  
 Midge *See Erysiphe graminis*  
 Mitochondria, enzyme activity in, 30  
 Moths  
 diamond back, monitoring of, 80, 84  
 pea moth monitoring system, 80, 83, 84, 162, 245, 246  
 pheromones from, 111, 162  
 sex attractants for, 83, 84, 117  
 statistical analysis of experiments on, 245, 246  
*Musca domestica See Housefly*  
 Mutant selection, 28, 31  
 Mycorrhiza  
 assessment of infection by, 188  
 ectotrophic, 190  
 effect of aldicarb on, 189  
 effect of inorganic ions on, 189



## INDEX

- Nematodes, scientific names of (*contd.*)  
*Helicotylenchus* spp., 20, 141  
*Helicotylenchus canadensis*, 141  
*Helicotylenchus digonicus*, 141  
*Helicotylenchus exallus*, 141  
*Helicotylenchus pseudorobustus*, 141  
*Helicotylenchus vulgaris*, 66, 141, 148  
*Heterodera avenae*, 146  
*Heterodera daverti*, 143  
*Heterodera goettingiana*, 143, 147  
*Heterodera schachtii*, 66, 143  
Heteroderidae, 141  
*Longidorus* spp., 142, 143  
*Longidorus caespiticola*, 147  
*Longidorus macrosoma*, 141  
Meloidogynidae, 141  
*Merlinius joctus*, 143  
*Merlinius nanus*, 142  
*Pratylenchus* spp., 20, 140  
Rhabditidae, 141  
*Rotylenchinae*, 141  
*Rotylenchus fallorobustus*, 141  
*Rotylenchus goodeyi*, 141  
*Rotylenchus pumilus*, 141  
*Rotylenchus robustus*, 141  
*Scutylenechus quadrifer*, 142  
*Tylenchina*, 141  
*Tylenchorhynchidae*, 141, 142  
*Tylenchorhynchus* spp., 20, 142  
*Tylenchorhynchus dubius*, 142  
*Tylenchorhynchus judithae*, 142  
*Tylenchorhynchus lamelliferus*, 142  
*Tylenchorhynchus maximus*, 142  
*Tylenchorhynchus microphasmis*, 143  
Nepal, agricultural research in, 253  
Nigeria, agricultural research in, 254  
Nitrate,  
leaching of in soil, 235, 236  
soil analysis for, 239  
Nitrification, at near zero temperatures, 125  
Nitrogen  
metabolism of, 27, 28  
soil analysis for, 239  
Nitrogen fertilisers  
effect on earthworms, 89  
effect on winter wheat, 40, 41, 225  
for sugar beet, 56, 60-62  
for winter wheat, 19, 20, 24, 25  
'Nitro-Chalk', 89  
on beans, 191  
on maize, 105, 106  
recommended levels for cereals, 246  
Nitrogen fixation, 191, 192  
ammonia assimilation during, 29, 30  
Nitrogenase activity, 191  
5-Nitro-8-hydroxy-quinoline, for seed treatment of  
potatoes, 178  
*Nitrosolobus* spp. 125  
*Nitrosomonas* spp. 125  
*Nitrospira*, arctic isolates of, 194  
Nodulation  
of bean, 191  
of soy bean, 192  
Nodules  
damage to by *Sitona*, 191, 192  
glutamine synthetase in, 29, 30  
ineffective, 191  
Norfolk, soil survey in, 200  
Northamptonshire, soil survey in, 200, 201  
Northern England, soil surveys in, 201, 202  
Nucleic acid studies, 33  
Nugget variances, 215  
Nutrient uptake, effect of drought on, 159  
Oats  
effect of weather on varieties, 98  
stem nematodes on, 145, 146  
Oilseed rape, *Pyrenopeziza brassicae* on, 176  
*Olpidium*, effect of new fungicides on, 170  
282  
Onion fly (*Delia antiqua*), 121  
Onions  
spread of VA mycorrhizal endophytes in, 187  
stem nematodes on, 145, 146  
Opencast sites, soil surveys of, 212, 213  
Organic carbon, determination of in soils, 239  
Oxamyl, as a nematicide, 145  
Paleosols, origins of, 214  
Palm oil Research Institute, 253  
Pea moth, *See* Moths  
Peas  
leafless, 85  
semi-leafless, effect of mycorrhizal inoculation on,  
186  
*Sitona* spp. on, 84  
stem nematodes on, 145  
Peat Experiment, at Woburn, 234  
Peat soils, 207, 208, 210-212  
Perchloric acid digestion, of sodium bicarbonate soil  
extracts, 238, 239  
Pesticides  
controlled drop application of, 120  
degradation of in soil, 124, 125  
electrostatic, 119, 120  
in seed treatments against slugs, 118, 119  
insect resistance to, 80  
leaching of, 119  
microbial degradation of, 125  
poisoning of honeybees by, 81, 86  
soil adsorption of, 119  
sprays for, 119, 120  
uptake of into earthworms, 125  
use of, 79-81  
*See also:* Aphicides; Fungicides; Insecticides;  
Nematicides  
Pests, integrated pest control experiment, 81  
*Phaenoglyphis* spp., 88  
*Phaseolus vulgaris*  
nitrogen fixation in, 29, 30  
spread of VA mycorrhizal endophytes in, 187  
use of for mass inoculum production, 188  
*See also:* Beans  
Pheromone traps, *See* Insect traps  
Pheromones  
alarm, in aphids, 116  
Nasonov pheromone, 86, 117  
of *Ephestia kuehniella*, 117  
of *Plutella xylostella*, 117  
sex attractant, 117  
*Phialophora radicola*  
var. *graminicola*, 171  
var. *radicicola*, 171  
*Phoma exigua* var. *foveata* (gangrene on potato)  
development of in store, 179, 180  
incidence of, 166, 178  
infection of stems and stolons, 179, 180  
Phorate, for *Sitona* on peas, 85  
Phosphate fertilisers  
adsorption of on allophanic soils, 229  
effect on take-all in winter wheat, 227-229  
sensitivity of mycorrhiza to, 186  
Phosphorus in soil  
effect of mycorrhiza on concentrations of, 229  
prevention of volatilisation of, 238  
uptake of by Sitka spruce seedlings, 190  
Photorespiration, in spring wheat, 42  
Photosynthesis  
ARC Priority Programme on, 39  
in CO<sub>2</sub> enriched spring wheat, 43  
leaf chamber for, 160  
*Phytophthora infestans* (blight) on potatoes, 99  
*Phytophthora megasperma* on beans, 166, 175, 176  
Pirimicarb  
for control of aphids, 21, 81, 87  
on beans, 98  
on winter wheat, 18, 87  
*Plasmodiophora brassicae* (clubroot) of cabbage, 121,  
122, 177  
*Platycheirus clypeatus*, 87



## INDEX

- Plutella xylostella*, 117  
 Pollution, effect on growth of barley, 40  
*Polymyxa*, effect of new fungicides on, 170  
 Polypeptide patterns, 31–34  
 Polyphenol content, of leaves, 237, 238  
 Polythene barrier, use of in aphid predator experiments, 88  
 Porometer, calibration of, 160  
 Potassium, complexes formed from cations of, 131  
 Potassium fertilisers,  
     critical potentials, 230, 231  
     for winter wheat, 19, 20, 24, 227  
     soil potentials, 230, 231  
 Potatoes  
     black dot (*Colletotrichum coccodes*) on, 179  
     blackleg on, 178  
     black scurf (*Rhizoctonia solani*) on, 177, 179  
     common scab on, 110, 121, 122  
     cyst nematodes on, 99, 140, 142–145  
     diseases of, 177, 181  
     dry rot (*Fusarium solani* var. *caereuleum*) on, 179  
     effect of glandular hairs on spread of viruses, 180  
     effect of weather on diseases of, 178  
     effectiveness of glandular hairs in controlling pests on, 166, 180  
     effects of lodging on, 49, 50  
     effects of silicate on, 104, 105  
     gangrene (*Phoma exigua* var. *foveata*) on, 166, 178–180  
     irrigation of, 98  
     *Phytophthora infestans* (blight) on, 99  
     plant density, 49  
     radiation interception in, 49, 50  
     rotting of in store, 178  
     seed treatment of, 178, 179  
     silver scurf (*Helminthosporium solani*) in, 180  
     skin spot on, 180  
     source-sink relationships in, 39, 50  
     tuber bulking, 50  
     tuber growth, 39  
     tuber soft rot (*Erwinia caratovora* var. *Caratovora*) on, 178  
     tuber yields, 49, 50  
     use of grafting techniques in, 50  
     virus diseases of, 28  
     ware treatment before storage, 179  
     yields, 98, 99  
 Powys, soil survey in, 204  
 Prochloraz  
     development of, 126  
     effect on *Alternaria*, 169  
     for control of gangrene in potato, 179  
 Propionate, degradation of, 125  
 Propionic acid for preservation of damp hay, 125, 169  
 Protein  
     in cereal seed, 27  
     *in vitro* synthesis of, 33  
     in wheat flour, 33, 34  
     leaf, 238  
     plant, virus-induced, 28  
     PR, 28, 29  
     storage, in cereals, 31–34  
*Pseudo-cercospora herpotrichoides* (eyespot)  
     behaviour of spores of, 166, 167  
     droplet size, 167, 168  
 Pygmy mangold beetles, *See* Beetles  
 Pyrazone, (chloridazone) on sugar beet, 58  
*Pyrenopeziza brassicae*  
     behaviour of spores of, 166  
     control of, 176, 177  
     splash dispersal of, 168  
 Pyrethroids  
     action *in vivo*, 112, 113  
     activity of in different insect species, 118  
     effect on houseflies, 111  
     environmental advantages of, 110  
     housefly resistance to, 80, 114, 115  
     insecticidal activity of, 111, 112  
     kinetic control, 112  
 Pyrethroids (*contd.*)  
     knock-down resistance to, 113  
     stereoselectivity of, 112  
     synergism, 115  
     *See also:* Insecticides  
*Pythium* spp.  
     on barley roots, 170  
     on beans, 175  
     on sugar beet, 58  
 Rainfall  
     at Rothamsted, 95, 96  
     at Woburn, 95  
 Rainswitches, use of in study of splash-dispersed diseases, 167  
 Red clover  
     crimson clover latent virus, 174, 175  
     inoculation of with mycorrhiza, 186  
     symbiotic effectiveness in, 192  
 'Reslin 10', effect on houseflies, 114  
 Restoration plan, for opencast sites, 213  
*Rhizobium* spp.  
     'accelerated storage test' for, 190  
     formation of ineffective nodules by, 191  
     freeze-drying of, 190  
     *Rhizobium leguminosarum*, 191  
     *Rhizobium meliloti*, 106  
     *Rhizobium trifolii*, 191  
     testing pre-inoculated seed, 190, 191  
*Rhizoctonia* spp. on sugar beet, 58  
*Rhizoctonia solani*, on potatoes, 177, 179  
 Rhizosphere microbiology, 185  
*Rhynchosporium secalis*  
     collection and measurement of splash droplets, 168  
     dispersal of spores, 166, 168  
     infectivity test for, 168  
 Rickettsia-like organism, in diseased clove trees, 170  
 Rickettsiales as parasites of cyst-nematodes, 147  
 'Ridomil' (metalaxyl)  
     as a fungicide, 170  
     on lupins, 175  
 Root density effect on spread of mycorrhizal endophytes, 187  
 Root mat, spread of mycorrhizal endophytes in, 188  
 Rotation  
     effect on seedling establishment in sugar beet, 58, 59  
     five-course, at Broom's Barn, 65  
 Rothamsted Farm  
     growth of winter wheat at, 23–25, 225  
     potato viruses at, 181  
     weather at, 264  
     winter wheat yields at, 17, 18, 22, 23  
 Rothamsted Insect Survey, 80  
 Rovral, effect on *Alternaria*, 169  
 Ryegrass, *See* Grass  
 Salicylhydroxamic acid, inhibition of cyanide-resistant oxidase by, 44  
 Saxmundham  
     influence of rainfall on wheat yields at, 225, 226  
     weather at, 267  
 Seed  
     legume, inoculation of with rhizobia, 190, 191  
     treatment of against slugs, 118, 119  
     treatment of against wheat bulb fly, 118  
 Seed Store Stock Control System 77  
 Seeds  
     aspartate kinase from, 30  
     cereal, S content of, 34  
     sugar beet, pelleting of, 62  
 Silicate, effects on Hoos barley, 104, 105  
 'Sisthane', effect on gangrene of potato, 179  
 Sitka spruce seedlings, inoculation with *Thelephora terrestris*, 190  
*Sitona* spp. 84, 85, 89, 191  
     *See also:* Beetles  
 Slugs, in cereals, 118  
 Small-plot experiments, 101, 102



Spores (*cond.*)  
*Entomophthora* spp., 193  
 evaluation of samples, 166, 167  
 mycorrhizal, 189  
 rain-activated switches for study of, 167  
 separation of from soil particles, 167  
 splash-dispersed, 166-168  
 studying spread of by chemical labelling of spray  
 drops, 161, 162  
 Spraying  
 equipment for, 120  
 of growth regulators, 122  
 Statistical analysis  
 anthelmintic survey, 249  
 for ADAS fertilizer recommendations for cereals,  
 247  
 for National Grassland Trial, 247  
 for ODA projects, 254  
 of cyst nematode populations, 246  
 of experiments on pea moth, 245, 246  
 of field experiments, 249  
 of interactions of variety and environment in  
 cowpea, 254  
 of livestock experiments, 246-248  
 of numbers of rhizobia in soil, 246  
 of rotation/fertiliser trial in Uganda, 254  
 of translocation of carbon in barley, 246  
 Rothamsted Insect Survey, 80  
 routine analysis, 249  
 Survey of Fertiliser Practice, 248  
 Weed Beet Survey, 249  
 Statistical models  
 for soil crack patterns, 235  
 for spread of mycorrhizal infection on roots, 229  
 CLASP, 253  
 documentation, 252  
 Generalised Linear Interactive Modelling, 252  
 Genkey, 250, 253  
 GENSTAT, 249, 251, 252  
 KYST, 253  
 Macro library, 252  
 Maximum Likelihood Program, 252, 253  
 multidiimensional scaling and unfolding, 253  
 See also: Computer Programs  
 Statistical theory  
 asymmetry in multivariate analysis, 250  
 identification keys, 250  
 intercropping, 254, 255  
 multidimensional scaling, 250  
 non-linear inference, 249, 250  
 tests for spatial pattern, 250, 251  
 Stomata, effect of ionophores on, 135  
*Streptomyces scabies* (common scab on potato),  
 control of by foliar sprays, 122  
 Suffolk, soil survey in, 200  
 Sugar beet  
 Amono, 47  
 Anglo Maribo Polybeet, 47  
 aphids on, 56, 62, 63  
*Atonaria linearis* on, 59  
 auxin concentration in, 48, 49  
*Beta vulgaris*, 48, 49  
 cambial activity in, 48, 49  
 carbolfuran on, 66  
 carbon dioxide exchange by, 60  
 crop establishment, 57, 58  
 diseases of seedlings, 57  
 Docking disorder, 56  
 drill efficiency, 57  
 effect of aldicarb on, 58, 59  
 effect of chloridazone on, 58  
 effect of HCH on, 58  
 effect of light quality and duration on, 47, 48  
 effect of rotation on, 58  
 effect of soil nitrogen content on, 61  
 effect of temperature on, 46, 47  
*Entomophthora* spp. on, 63  
*Erysiphe betae* on, 64

Soil analyses, 239  
 Soil biomass, fumigation method for measurement of,  
 234  
 Soil mineralogy, ochre in field drains, 236  
 See also: Clay minerals  
 Soil moisture, See Soil water  
 Soil nutrients, 224  
 Soil organic matter  
 copper complex formation by, 231  
 effect of direct drilling on, 233  
 effect of mechanical disturbance on, 233, 234  
 effect on cereal yields, 234, 235  
 fumigation method of measuring microbial  
 biomass, 234  
 Soil-related diseases, 215  
 Soil respiration, equation for, 158  
 Soil series, trace elements in, 232, 233  
 Soil solution extraction, samplers for, 239  
 Soil structure  
 aggregate size distribution, 236  
 crumb porosity, 157, 193  
 diffusion-controlled solute movement, 236  
 gaseous diffusion in field soils, 158, 193  
 gaseous diffusion in natural and remoulded  
 crumbs, 157, 158  
 image analysis of void structure, 235  
 ion diffusion in structured soil, 236  
 pore size distribution, 238  
 shrinkage, 235  
 stability of aggregates, 193  
 structural regeneration in compacted soils, 235  
 Soil surveys  
 Cornwall, 202-204  
 Devon, 202-204  
 Dyfed, 205  
 East Anglia, 200  
 Hampshire, 200  
 Herefordshire, 200, 201  
 Norfolk, 200  
 Northamptonshire, 201  
 Powys, 204  
 Somerset, 207  
 South East England, 202, 205  
 South West England, 202-205  
 Suffolk, 200  
 Sussex, 200, 202  
 Wales, 204, 205  
 Worcestershire, 200  
 Soil temperature, 156, 209, 210  
 Soil thermal conductivity, 157  
 probe for, 157  
 Soil water  
 changes in soil water pressure, 154, 155  
 development of soil water profiles, 156  
 groundwater flow, 155  
 hydraulic conductivity measurements, 155  
 land drainage, 154  
 mole drains for, 154  
 plant response to water stress, 159, 160  
 regimes, 215  
 scaling techniques, 156  
 soil water retention, 216  
 theory of time response, 154, 155  
 water content, 156  
 water relations in rooting zones, 156  
*Solanum berthaultii*, aphid-trapping hairs on, 180  
 Solutes, model for movement of in soil, 235, 236  
 Somerset, soil survey in, 207  
 South East England, soil survey in, 202-205  
 South West England, soil survey in, 202-205  
 Soy bean (*Glycine max*), nodulation of, 192  
 Spores  
 behaviour of, 166  
 deposition of, 161  
 dispersal gradient, 167  
 dispersal of from dry leaves by water drops, 168  
 droplet size, 167, 168

INDEX



## INDEX

- Sugar beet (*contd.*)  
 field performance of seed, 58  
 final leaf size, 47  
 germination, of 57  
 herbicides for, 58, 59  
*Heterodera schachtii* on, 66  
 Hilleshog Monotri, 47  
 hormonal control of storage root development in, 48, 49  
 irrigation for, 60  
 leaf expansion in, 46, 47  
 leaf production in, 47  
 manganese for, 62  
 mangold, 48, 49  
 nematodes on, 56, 66  
 nitrogen application, time for, 61, 62  
 nitrogen fertiliser for, 56, 60–62  
 nitrogen uptake, by 61  
 Nomo, 47  
 pelleted seeds, 62  
 pesticides for, 66  
 pests of, 57, 58, 88  
 phenylacetone nitrile in, 49  
 plant clinic, 57  
 radiation interception, 60  
 seedling establishment, 58, 59  
 Sharpe's Klein Megapoly, 47  
 Sharpe's Klein Monobeet, 47  
 sowing time, 57, 58  
 spiral nematodes on, 148  
 stem nematodes on, 146  
 sugar accumulation in, 48  
 sugar production, 60  
 sulphur for, 64  
 virus yellows, 63  
 Vytomo, 47  
 weed beet, incidence of, 67  
 weed beet, population dynamics of, 67  
 Weed Beet Survey, 249  
 weight of seedlings, 58  
 yields, 56, 66  
 Sulphur dioxide, concentration of in open-topped chambers, 40  
 Sumatra  
   disease of cloves in, 170  
   disease of coconuts in, 169, 170  
 Superphosphate, effect on semi-leafless peas compared with mycorrhizal inoculation, 186  
 Sussex, soil survey in, 200, 202  
 Symbiotic effectiveness, breeding for, in red clover, 192  
 Syrphid flies, 87  
*Syrphus vitripennis*, 87  
 Take-all on cereals, 97, 166, 193  
   decline of, 172  
   effect of added inoculum and soil sterilisation on, 171, 172  
   effect of phosphate and potassium fertilisers on, 172, 227–229  
 Tantalum, complex of, 136  
 'Telone', as a nematicide, 186  
*Thelephora terrestris*, inoculation of Sitka spruce seedlings with, 190  
 Thiabendazole  
   effect on gangrene, 179  
   for seed treatment of potatoes, 179  
   for ware treatment of potatoes, 179  
*Thiobacillus thiooxidans*, 237  
 Thiocarbonyl, effect on slugs, 118  
 Tillage experiments, 156, 157  
 Tobacco, virus disease of, 29  
*Toxares deltiger*, 88  
 Trace elements  
   in five soil series, 232, 233  
   relationships between extractable and total amounts of, 233  
   trace metal analysis, 238  
   X-ray fluorescence spectrometry of, 232  
 Triadimefon, 96  
 Triazophos  
   for *Sitona* on peas, 85  
   poisoning of honeybees by, 117, 118  
 Tridemorph, 98, 172  
*Trifolium repens*, See Clover  
 Triforine  
   as a seed treatment to control mildew, 172  
 Tungsten complex, 136  
 Turbulent diffusion coefficient, 161  
 Unit of Nitrogen Fixation, 136  
*Verticillium lecanii*, on developing wheatears, 22  
 Viruses  
   aphid vectors of, 81  
   mite vectors of, 174  
   nepoviruses, 175  
   of cereals, 20, 81, 173  
   of clover, 174  
   seed-borne, 176  
   transmission of through pollen, 176  
   with isometric particles, 175  
 Viruses, names of  
   agropyron mosaic virus, 173  
   barley yellow dwarf virus, 20, 81, 173  
   bean yellow mosaic virus, 176  
   beet mild yellowing virus, 63  
   beet yellows virus, 63, 116  
   crimson clover latent virus, 174, 175  
   incidence of potato viruses at Rothamsted, 181  
   potato leaf roll virus, 181  
   potato virus X, 28  
   potato virus Y, 180, 181  
   ryegrass mosaic virus, 174  
   tobacco mosaic, 29  
   vicia cryptic virus, 176  
 Wales, soil survey in, 204, 205, 216  
 Water cress, identification of 3-phenylpropionitrile in, 49  
 Water stress  
   in cabbages, 177  
   in cereals, 159  
 Weather  
   at Broom's Barn, 266  
   at Rothamsted, 264  
   at Saxmundham, 267  
   at Woburn, 265  
 Weed Research Organisation, 119  
 Weeds  
   effect of fertilisers on, 52  
   effect of spraying on, 52  
   germination of seedlings in pans, 52, 53  
   on Broadbalk, 51, 52  
   on Park Grass, 50, 51  
 Weevils, See Beetles  
 Wheat  
   Agropyron mosaic virus in, 173  
   aldicarb for, 20  
   *Alternaria* on, 169  
   aphids on, 82, 83  
   at Rothamsted and Woburn, 97  
   baking quality of flour, 33, 34  
   chlormequat on, 17  
   *Cladosporium* on, 169  
   CO<sub>2</sub> enrichment in, 42, 43  
   computer model for growth of, 227  
   dark respiration in, 43, 44  
   ear dry matter yields, 23  
   ear dry weight, 24  
   ear growth in, 43  
   ear initiation, 18  
   effect of ear-halving, 41  
   effect of fungicide and aphicide on, 19  
   effect of fungicides on yield, 97  
   effect of growth substances on, 45  
   effect of irrigation on, 18, 40, 225  
   effect of nitrogen fertiliser on, 40, 41  
   effect of P and K fertilisers on, 228, 229



- Wheat (*contd.*)  
photosynthesis in, 43  
pre-harvest sprouting, 45  
seed drills for, 18  
*Septoria* on, 21  
shoot number, 23  
Sicco, 43, 45  
stem nematodes on, 145, 146  
take-all on, 97, 172, 193  
tiller numbers in, 40, 41, 43  
total dry weight of, 19  
trihydroxyoctadecanoic acids in, 46  
yields, 17, 22, 23, 96, 97  
Wheat bulb fly, seed treatments against, 118  
Wheatmeal, undated, gliadin fraction from, 32  
Wild oats, (*Avena fatua*)  
difenoquat for control of, 97  
on Broadbalk, 51, 52  
Wind tunnel, experiments in, 153, 160  
Woburn  
crop sequence experiments at, 96, 97  
growth of winter wheat at, 22-25  
maize experiments at, 105, 106  
Peat Experiment at, 234  
weather at, 265  
wheat experiments at, 225  
wheat yields at, 22, 23  
Wood Walton Fen, peat soils in, 210-212  
Worcestershire, soil survey in, 200  
X-ray fluorescence spectrometry analysis of small samples by, 238  
for determining trace elements in soils, 232, 233
- Wheat (*contd.*)  
effect of removal of glumes, 45, 46  
effect of soil organic matter on yield, 234, 245  
effect of soil type on yield, 226, 227  
effect of weather on, 97  
eyespots on, 122, 167  
fungicides for, 122  
*Fusarium* on, 122, 169  
genetic manipulation of, 34  
gibberellins in, 46  
gliadin fraction of, 32  
glume senescence in, 45  
grain size, 41  
grain yields, 40, 41, 43  
growth of, 18, 22-25  
Highbury, 45  
Hobbit, 45  
Huster, 45  
influence of rainfall on, 225, 226  
Kleiber, 43, 45  
leaf area index, 23  
light interception, 18  
Maris Huntsman, 40, 41, 45, 46  
microflora of developing ears, 22, 169  
mildew on, 25  
multi-factor experiments with, 225  
N and K content of, 19, 20  
nitrogen for, 18  
nitrogen uptake by, 225  
number of shoots, 18  
oxygen uptake by stems, 44  
pesticides on, 18  
pests of, 87, 88  
photosynthesis in, 42, 43  
pests of, 87, 88  
pesticides on, 18  
oxygen uptake by stems, 44  
number of shoots, 18  
nitrogen uptake by, 225  
nitrogen for, 18  
N and K content of, 19, 20  
multi-factor experiments with, 225  
mildew on, 25  
microflora of developing ears, 22, 169  
Maris Huntsman, 40, 41, 45, 46  
light interception, 18  
leaf area index, 23  
Kleiber, 43, 45  
influence of rainfall on, 225, 226  
Huster, 45  
Hobbit, 45  
Highbury, 45  
growth of, 18, 22-25  
grain yields, 40, 41, 43  
grain size, 41  
glume senescence in, 45  
gliadin fraction of, 32  
gibberellins in, 46  
genetic manipulation of, 34  
*Fusarium* on, 122, 169  
fungicides for, 122  
eyespots on, 122, 167  
effect of weather on, 97  
effect of soil type on yield, 226, 227  
effect of soil organic matter on yield, 234, 245  
effect of removal of glumes, 45, 46

INDEX