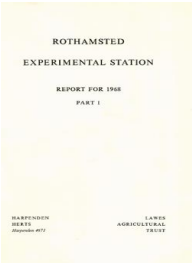
This work is licensed under a Creative Commons Attribution 4.0 International License.

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 readible, or you suspect there are some problems, please let us know and we will correct that.

Report for 1968 - Part 1

Full Table of Content


ROTHAMSTED
EXPERIMENTAL STATION
REPORT FOR 1968
PART 1

Index

Rothamsted Research

Rothamsted Research (1969) *Index ;* Report For 1968 - Part 1, pp 391 - 404 **- DOI: https://doi.org/10.23637/ERADOC-1-123**

This work is licensed under a Creative Commons Attribution 4.0 International License.

SUBJECT INDEX

Numbers in italics refer to the Abstracts of Papers on pp. 320–375. The General Report by the Director (pp. 25–30) has not been indexed.

Absidia spp. on mouldy hay, 133
Actinomycetes
  in wet and mouldy hay, 132
  on stored products, 132, 133
Agricultural meteorology, 31–34, *1·6*, *1·7*
Agriotes. *See* Wireworms; Click beetles
Agropyron repens. *See* Couch grass
Agrostis gigantea (bent couch grass)
  comparison with growth of wheat, 108
  germination of seeds, 107, *5·19*
  in cereals, 137, 256
Alizarin Red S, for determining aluminium, *3·6*
Aldrin
  conversion to dieldrin in soil, *10·17*
  effect on soil fauna, *10·17*
  volatilisation of, 184
Allethrin, toxicity to mustard beetle, 180–181
Alopecurus myosuroides. *See* Blackgrass
Alpha-aceto-gamma-hydroxy butyramide, for sterilising nematodes, 156
Aluminium, in silicate minerals, determination of, *3·6*
Aluminosilicates, determination of fluorine in, *3·9*
Amino acids in grass, effect of N and K on, 52–53
Amino-triazole
  effect on nematodes, 165
  to control couch grass, 268
Amitrole, for weeds in spring barley, 137
Ammonia, anhydrous
  compared with 'Nitro-Chalk', 38–41
  for grass, 38–41
  for spring wheat, 41
  for sugar beet, 287
  spacings of injections on grass, 39–40
  time of application to grass, 38–39
Ammonia, aqueous
  compared with 'Nitro-Chalk', 38–41
  compared with urea, 41
  for barley, 41
  for grass, 38–41
  time of application to grass, 38–39
Ammonium nitrate
  compared with calcium nitrate on wheat, 44
  compared with IBDU, 42–43
  for grass, 38, 42–43
Ammonium nitrogen in plant extracts, 60
Ammonium sulphate for wheat
  compared with calcium nitrate, 44, *2·18*
  with nitrification inhibitor, 44, *2·18*
Anemometers, for microclimate in crops, 31
Anti-oxidants in cereal leaves, 114
Aphicides
  demeton-methyl, 201
  disulfoton ('Disyston'), 191–192, 204
  effect on beet yellows virus, 270–272
  effect on germination of sugar beet, 271
  effect on yields, 200–201, 204
  menazon ('Saphizon'), 204, 270–272, *16·2*, *16·8*
  'Metasystox', 203, 264
  on sugar beet, 270–272
  phorate granules, 191–192, 263
  residue in peas in pod, 207
Aphicides (*contd.*):
  'Roger-E', 200
  systemic on peas, 204
  'Temik', 271, 272, 274, 275, 280-283
    See also Insecticides
Aphids
  bioassay on field beans, 191–192
  cannibalism by, *9·7*
  catches, monthly totals, 205–206
  cereal aphids as virus vectors, 208
  early records of *Myzus persicae*, 209
  effect of age on flight, *10·24*
  effect of fungicides on, 130
  effect of light on migration, 209, *10·24*
  effect of nematicides on, 159
  effect of starvation on flight, *10·24*
  effect of temperature on eggs, 202
  effect on bean losses, 201
  effect on cereal losses, 129–131, 200
  Entomophthora, on, 230, 231, *16·6*
  flight of, factors affecting, *10·24*
  micro-organisms on eggs, 202
  migration, 209, 272, *10·2*, *10·15*, *10·24*
  multiplication of, 130
  on cereals, 129, 200, 208, 262
  on lucerne, 203
  on peas, 204
  on sugar beet. *See* Sugar beet
  on weeds, 272
  overwintering hosts of, 202, 272
  overwintering of pea aphids, 202
  population studies on *Aphis fabae*, *9·25*
  predators on, *9·6*, *9·7*
  sampling for, *10·25*, *16·10*
  seasonal trends, 208
  spray warning system, 270
  traps for, 129, 208–214, 272, *10·25*, *16·10*
  virus diseases and, 129, 203–204
Aphids, specific names of
  Acyrthosiphon pisum, 202, 203, 204, 209, 230
  Aphis fabae, 191, 192, 201, 203, 209, 230, 231, 273, *9·6*, *9·25*, *10·24*, *16·9*, *16·10*
  Aphis pisum, 231
  Cavariella theobaldi, 231
  Macrosiphum euphorbiae, 264, 272
  Macrosiphum granarium, 209
  Metopolophium dirhodum, 130, 200, 206, 208
  Metopolophium festucae, 206, 208
  Myzus ascalonicus, 272
  Myzus persicae, 129, 192, 203, 209, 231, 272–273, *16·9*, *16·10*
  Rhopalosiphoninus latysiphon, 272
  Rhopalosiphoninus staphyleae, 272
  Rhopalosiphum spp., 130, 205, 208, 209
  Schizaphis graminum, 209, *10·24*
  Sitobion avenae, 130, 200, 203, 205, 208, 209, 262
  Sitobion fragariae, 231
Aspergillus spp.
  in decomposition of herbicides, 83
  on wet and mouldy hay, 132
Astragalus glycophyllus, bacteroids in nodules of, 89
Athous bicolor. *See* Click beetles

https://doi.org/10.23637/ERADOC-1-123

This work is licensed under a Creative Commons Attribution 4.0 International License.

Atmospheric humidity, effect on crop, 94
Auxin
  cell expansion promoted by, 101
  conversion of tryptophans to, *3·12*, *5·17*, *5·18*
  in *Azotobacter chroococcum*, 83
  in plants infected with nematodes, *8·18*
Azinphos-methyl, toxicity to bees, 188
Azotobacter
  auxins in, 83
  metabolism of benzoic acids by, 83
  production of growth substances by, *4·2*

B9 (B-nine)
  effect on beans, 257
  effect on protein of bean leaves, *5·11*
Bacteria, isolation of ammonia-oxidising autotrophic, *4·4*
Bacteriophage of *Rhizobium*, 87
Bacteriostasis, in soil and rhizosphere, 83
Bacteroids in nodules, 89–90, *4·3*
Bagassosis, 132, 133
Barley, 41–46, 133–139, 256, 263, 268
  Agrostis gigantea in, 137, 256
  break crops tested with, 256
  calcium nitrate on, 45
  continuous, decline of take-all on, 137
  effect of bare fallow on, 250
  effect of formalin on yield, 45
  effect of N fertilisers on, 41–44, 137–138, 161, 249, 256, 294–295,
  effect of P fertilisers on, *2·21*, *2·22*
  effect of previous cropping on yield, 43
  effect of sodium on, *2·12*
  effect of wild oats on, 109
  farmyard manure for, 248–250
  fertilisers for, 41–46, 137–138, 248–250, 253, *22·21*, *2·22*
  fungicides on, 93
  in Legumes and Barley Experiment, 256, 257
  in Ley-Arable Experiments, 252–254, 267
  in rotation with sugar beet, 292–294
  irrigation on, 37
  nematode-resistant, 161
  nematodes on, 161–166
  nitrate in sap of, 50
  nurse crops, 256
  root growth, effect of CCC on, 103
  root growth, effect of compacted soil on, 97
  root growth, effect of shading on, 96
  root growth estimated by sampling, *5·16*
  silicate for, 248
  undersowing with trefoil, 256
  weeds in, 137, 256
  yields, 45, 137–138, 248–250, 252–254, 263, 266
  See also Cereals; Take-all
Barley Variety Experiments, 267
Barnfield
  barley on, 248–250, 260
  beans on, 59, 141, 248, 249, 254, 260
  herbicide adsorption by soils, 60
  modifications in 1968, 247, 251, 260
  wheat on, 248–250, 260
BASF, effect on aphids, 130
Beans (*Phaseolus vulgaris*), 263, 268
  bacteroids in nodules of, 90
  castor meal on, 248
  changes in leaf protein in, *5·11*
  chocolate spot on, 262
  conversion of tryptophan to auxin in leaves, *5·17*
  damage by herbicides, 59, 260
  effect of CCC and glycine betaine on, *5·18*
  effect of diquat on, 260
  farmyard manure on, 248–250, 259

Beans (*Phaseolus vulgaris*) (*contd.*):
  fertilisers on, 248, 249, 254, 259
  growth regulators on, 257
  irrigation on, 36, 254, 257, 261
  leaf spot on, 262
  nematodes on, 166, 257, 262
  nitrogen fertilisers on, 257
  Phytophthora spp. on, 141
  pollination by bees, *11·14*
  potassium fertiliser on, 247, 260
  Rhizobium strains tested on, 267
  simazine on, 59, 248, 249, 254, 260, 261, 267, 268
  symbiosis in, 27
  yields, 248, 249, 254, 263
  See also Field beans
Bee Advisory Service, 187
Bees. *See* Honey Bees; Bumblebees
5-Benzyl-3-furylmethyl chrysanthemate and analogues, insecticidal activity of, 181
  See also Pyrethroids
Beryllium, effect on plant growth, *2·30*, *3·13*
BHC
  effect on pasture productivity, 222
  effect on soil fauna, 222
  effect on sugar-beet seedlings, 274, 275
  poisoning of honey bees by, 187
  seed dressings, 274
Biotite, K–Na concentrations in, 64
Blackcurrants, pollination of, *11·16*, *11·17*
Blackgrass (*Alopecurus myosuroides*), *5·5*
  comparison of plants from seeds of different origin, 105
  fungicides on, 94
  on Broadbalk, 106, 260
  seed dormancy during storage, 106
  seed germination, 106
Bombus spp. *See* Bumblebees
Boots RD 18502, 275, 282
British Film Institute, film on *Heterodera* spp., 170
British Sugar Corporation, 274, 286
Broadbalk
  analyses of time trends in treatments, 236
  beans on, 59, 247, 254, 260
  blackgrass on, 106, 260
  fertilisers used in revised experiment, 259
  modifications in 1968, 247, 251, 259
  nematodes on, 164
  paraquat on, 260
  potatoes on, 247, 260
  radio-carbon dating of soil organic matter on, 73
  soil survey of, 317
  weeds, changes in growth on, 110
  weeds, effect of simazine on, 110
  wheat on, 247, 259
  See also Report for 1968, Pt. 2
Buckinghamshire, soil survey in, 305
Bumblebees (*Bombus* spp.)
  foraging behaviour of, *11·16*
  pollination of beans by, 227, *11·14*
  'robbers', 227
  scent secretion of males, 174–175
  sex- and species-specific compounds in, 174–175

Calcium
  for Sitka spruce, 56–57
  in silicate minerals, 79
  nitrate, compared with ammonium fertilisers, 44, *2·18*
  nitrate, effect on barley yields, 45
Calcium-aluminium exchange in soils and clays, *2·15*
Cambridgeshire and Isle of Ely, soil survey in, 302

https://doi.org/10.23637/ERADOC-1-123

This work is licensed under a Creative Commons Attribution 4.0 International License.

Carbaryl
effect on earthworms and wireworms, 217
poisoning of bees by, 187
Carbon dioxide measurement, 33, *1·4*, *1·5*
Carbon in soil, equipment for measuring, 61
Cardiganshire, soil survey in, 309
Carrots, *14·1*
Castor meal on barley and beans, 248
CCC(2-chloroethyltrimethyl ammonium chloride)
effect on bean, 257
effect on bean leaves, *5·11*, *5·18*
effect on cereals, 102–104, *5·1*, *5·3*
effect on potatoes, 157
Cereal Disease Reference Plots, 134
Cereals
anti-oxidants in leaves, 114
aphids on, 129–131, 200–201, 208, 262
'break'-crops, 262
damage by symphylans, *10·23*
effect of CCC on, 102–104, *5·1*, *5·3*
effect of cultivation on, *1·1*
effect of 2,4-D on nematode-infested, *8·19*
eyespot on, 137–139, 141, 262
foot and root diseases, 133–141
fungus diseases, 93, 133–141, 262, 266, 268
grain/straw ratio, 260, 267
herbicides on, 58, 137, 260, 262
lodging of, 45, 102–104, 140, 250, 256, 261–263, 266, 268
mildew on, 93, 262, 266, 268
nematodes on, 141, 161–164, 169
perennial grass weeds in, *5·7*
viruses on, 129
See also Barley; Maize; Oats; Wheat; Take-all
Chalcedony
in Batcombe series of soils, 67
in Chiltern soils, 67
in clay-with-flints, 67
in Rothamsted soils, 67
origin of, 67
Cheshire, soil survey in, 301
Chlorbenside on pasture, 222
Chlordane, effect on soil fauna, 218
Chlorfenvinphos (Birlane)
effect on soil fauna, 217, *10·4*
effect on sugar-beet seedlings, 275, 282
leaching from soil, 217, *10·4*
Chlorophyll
bleaching of, 114
'changed' chlorophylls, 122
in assays for chlorophyllase, 113
Chlorophyllase, 113
Chlorophyllides, 114, 123
Chloropicrin, 150, 267
Chloroxon, resistance of houseflies to, 173
'Chlorthion', resistance of housefly to, 172–174
Ciba 10015, 275
Ciba 14421, 275, 282
Clay
aggregates, 69
artifacts in soil sections, 70
clay minerals and, *3·11*
deflocculation of, 75
effect of extracts of plant residues on, 75
orientation in soil sections, 70
physics of, 69–70
porosity of clay films, 70
ratios in soils, 310
surface charge on, 36
translocation of, 310
Clay soils, shrinkage of, 236
Claycroft field, fumigation comparisons, 140
Click beetles, sex attractants in, 195
Clinoptilolite
in sediments and soils, 66
Clover
copper in, 112, 115
effect of light on flowering, 88
manganese in seedlings, 116
nematodes on, 167, 168
nitrogen fixed by, 48
odulantion in, 88
symbiosis in, 82
See also Cluster clover; Subterranean clover
Cluster clover (*Trifolium glomeratum*), 82, 88
Cockroach (*Periplanata americana*)
effect of diazoxon on, 178, *9·8*
effect of pyrethrins on, 175–178
nervous system of, 175–178
nervous system, staining of, 190
Computers
data conversion from Orion to new computer, 244
multiaccess computing, 240, 243, 245
new computer (ICL 4/70), 233–234, 243–245
details of, 243
Fortran IV, 244–245
programs, 233–234, 244
Orion, 233
experiments analysed, 241
performance, 240
programs, 233, 242
volume of work, 241
programming languages, 233–235, 244–245
programs. *See* Statistical programming
service for other institutes, 236, 240, 243
Conifers
manuring experiments on, *2·4*, *2·5*
nutrition and soil fumigation, *2·2*
seedlings, diseases of, 151
sulphur deficiency in, 56–57
See also Sitka spruce
Controlled-environment, 88, 93, 134, 191
Copper
deficiency in Sitka spruce, 57, 116
enzymes containing copper, 112, 115, 116
in clover seedlings, 112, 115
Coprosma robusta, inoculation with *Endogone* spores, 85
Corn buttercup (*Ranunculus arvensis*), 110
Cotton stainer. *See Dysdercus intermedius*
Couch grass (*Agropyron repens*)
amino-triazole for controlling, 268
competition with growth of wheat, 107–109
effect of light on germination, 107
effect of shading on, 109
fungicides on, 94
germination of seeds, 106, *5·19*
host for nematodes, 164
in spring barley, 137
paraquat for, 260
viability of seeds, 106–107
Crop growth
effect of humidity on, 94
effect of CCC on, 102–104, *5·18*
effect of glycine betaine on, *5·18*
effect of insect attack on, 199–204
in controlled environments, 93
Crop physiology, *5·8*
Crop rotations for experimental stations, *14·2*
Crop sequence, effect on barley yield, 43
Cultivation–Weedkiller Rotation Experiment (Rothamsted)
barley yields on, 253
bean yields on, 254
potato yields on, 255, 261
sowing methods for cereals, 261
wheat yields on, 261
Cytokinins, cell division promoted by, 101

2,4-D, effect on nematode-infested cereals, *8·19*
Dazomet, 140, 157, 159, *7·13*

https://doi.org/10.23637/ERADOC-1-123

This work is licensed under a Creative Commons Attribution 4.0 International License.

'D-D'
as nematicide, 157–162, 165, 168, 169, 277–280
deformed wheat ears caused by, 140
effect on sugar-beet yields, 277–280
effect on wheat, *7·13*
taint of potatoes from, 161
DDT
effect on predators of frit fly, 221
effect on soil fauna, 216, 218, *10·17*
effect on sugar-beet seedlings, *2·75*
penetration into excised leaves, 186
penetration into houseflies, *9·20*
rates of removal in 'rainwashing', 184
Deep-drilled Fertiliser Experiment, 267
Demeton-methyl, effect on aphids, 201, 272
Derbyshire, soil survey in, 304
Devonshire, soil survey in, 308
Diazinon
effect on soil fauna, 217
metabolism by housefly, 171, 172
penetration into housefly, *9·20*
resistance of housefly to, 172–174, *9·22*
Diazoxon
effect on cockroach, 178
resistance of housefly to, 172
Dibutyltin, 197
Dieldrin
as seed dressing on sugar beet, 274
conversion from aldrin in soil, *10·17*
effect on Wheat Bulb fly, 200
leaching from soil, 217
on honey bees, *9·13*
resistance of housefly to, *9·23*
volatilisation of, 184
Dimethoate
effect of soil moisture on diffusion, 191
movement in soil, *9·16*
secretion into nectar, *9·21*
sorption of, by soils, 190
timing of sprays on Wheat Bulb fly, *9·17*
Diquat
for weeds in beans, 260
for weeds in potatoes, 264
Disulfoton
aqueous solutions of, 192
as aphicide, 204
effect of soil moisture on diffusion, 191
effect of watering on effectiveness, 191–192
effect on soil fauna, 217
movement in soil, *9·16*
Docking disorder of sugar beet, 277–282, *16·1*
acreage affected, 277
Barney type, 282
nematode numbers and fanginess, 277
viruses and, 277
Drainage water, loss of nitrate in, 51
'Dursban', effect on sugar-beet seedlings, 275
Dysdercus intermedius (Cotton stainer)
aggregation and dispersal of, 174, *10·33*
behaviour towards decoys, *10·33*
glandular secretions of, 174, *9·12*, *10·16*

Earthworms
burial of litter by, 236
effect of insecticides on, 217
effect of paraquat on, 218
effect of ploughing on, 218
East Anglia, soil survey in, 302
Electron microscopy
of bee-paralysis viruses, *11·10*
of clay fractions, *3·11*
of nematodes, 152
of potato virus X, 126
of *Rhizobium* cultures, 90
of soya bean nodules, 91
of tomato spotted wilt virus, 126
of virus protein, 126
Ely, Isle of, soil survey in, 302
Endogone spores, 84–86
Endosulfan, toxicity to bees, 188
Entomophthora spp.
on aphids, 230, 231, *16·6*
on Wheat Bulb fly, 230
Enzymes in leaves, 112–116
Essex, soil survey in, 305
Ethion, for control of Wheat Bulb fly, 195
'Ethrel', effect on barley and oats, 105
Evaporation rates and surface properties of crops, 32–33, *1·10*
Exhaustion Land
barley on, 250, 260
couch grass on, 260
fallowing of, 250, 251
Eyespot (*Cercosporella herpotrichoides*)
See Cereals, eyespot

Fallow
effect on barley, 250
to control twitchgrass, 262
Farmers' lung disease, 132, *7·9*
Farmyard manure
effects on arable crops and grass, *2·28*
on barley, 248–250
on beans, 247–250
on wheat, 247–250
Fenitrothion, effect on earthworms and wireworms, 217
Ferrous sulphide in soil, determination of, *3·10*
Fertiliser Manufacturers' Association, 236
Fertilisers
amounts used in United Kingdom, *2·7*
future trends in use of, *2·8*
granular compared with liquid, 41–42
liquid, 38–42, 287
methods of application, 41–42, *2·7*
residual effects of, 42
use of, in England and Wales, *12·2*, *12·3*
See also names of individual fertilisers
Field balances, 34
Field beans (*Vicia faba*)
aphids on, 201
bee poisoning on, 187
diseases of, 141
insecticides on, 187, 191, 192
nitrogen metabolism of, *6·31*
nucleic-acid metabolism of, *6·30*
virus diseases of, *7·14*
See also Beans
Flooded soils, 74
Fluorine
in alumino silicates, 79, *3·9*
in micas, 65–66
Food resources, *6·1*
Formaldehyde, 72
Formalin
effect on barley yield, 45, 46
effect on *Endogone* spores, 84
effect on grass, 46
effect on nitrogen in soil, 45–47
effect on take-all, 139–140
effect on wheat, 46–47
residual and cumulative effects of, 47, 139–140
Formalised casein for Sitka spruce seedlings, *2·3*
Fosters Field
barley and wheat on, 251–252
herbicide absorption by soil on, 60
oats on, 263
Frit fly (*Oscinella frit*)
distribution of eggs on plants, 220
effect of phorate on, 201, *10·30*
hymenopterous parasites of, *10·29*
larval competition, 220
on maize, 201, *10·30*
oviposition, effect of carabids on, *10·28*

https://doi.org/10.23637/ERADOC-1-123

This work is licensed under a Creative Commons Attribution 4.0 International License.

Frit fly (*Oscinella frit*) (*cont.*):
predators of, 221
Frost-heave, measurement of, *17·10*
Fumigation. *See* Soil sterilisation
Fungicides
as protectant for sugar beet at drilling, 275
BASF, 130
benzimidazole, 144–145
captan for sugar beet, 275
chlorinated phenols, 144–145
copper oxyquinolate, 276
damage to potatoes from, 198
'Dexon' for sugar beet, 275
dibutyltin dilaurate, 197
'Difolatan' (captafol), for sugar beet, 275
dithiocarbamate, 144–145
effect on aphids, 130–131
EMP steep for sugar beet, 275
fentin acetate, 196–198
fentin hydroxide, 276
'Fernacol', for sugar beet, 275
for cereal diseases, 93–94, 130, 197
for potato diseases, 142–144, 171, 196–198
for sugar beet diseases, 275
griseofulvin, effect on aphids, 130
maneb for sugar beet, 275
organo-mercurial, 142, 144, 145
organo-tin compounds for potatoes, 171, 196–197
oxathiins, 144, 145
'PP 149', 93
'PP 781', 93
'Phygon' (dichlone) for sugar beet, 275
thiram, 151, 275
Fungus diseases
bagassosis, 132, 133
control of, 144–149
effect of heat treatment on potato, 145
effect of nitrogen fertilisers on, 147
effect of soil moisture on, 147–149
farmer's lung, 132, *7·9*
from stored crops, 132, 133
mildew on cereals, 93, 262, 266, 268
mildew (downy) on sugar beet, 275, *16·5*
on cereals, 133–141, *7·23*
on conifer seedlings, 151
on damp hay, 132
on potato, 128, 141–150, 157
on Wheat Bulb fly, 219, 230
Ramularia leaf spot of sugar beet, 276
Verticillium wilt, 146, 149, 150, 157
Fungus spores
concentration on farms, 132
deposition within crops, 131
splash dispersal, 131

Gas–liquid flow control valve, 189
Garden Clover, magnesium in soil of, 250
Geescroft, 73
Gibberellins
cell expansion promoted by, 101
production of, by bacteria, 83
Glacial deposits, radio-carbon dating of, 68
Gloucestershire, soil survey in, 306
Glycine max. *See* Soyabean
Grass
amino acids in, 52
ammonia (anhydrous and aqueous) on, 38–41
ammonium hydroxide on, 40
ammonium nitrate on, 40, 42–43
effect of formalin on, 45–46
effect of insecticides on, 222
effect of liming and fertilisers on, *5·6*
effect of pests on, 222
effect on mineralisable N in soil, *2·17*
IBDU compared with ammonium nitrate on, 42–43

Grass (*contd.*):
irrigation on, 264
liquid nitrogen fertilisers for, 39–41
magnesium, effect on, 54–55
nitrate in sap of, 51
nitrogen fertilisers on, 39–43, 47, 52, 91, 264
potassium fertilisers, 52–53
protein content, 53
Great Field, potato yields on, 254–255
Great Harpenden Field, 219
Growth regulators, 83, 101–105, 257, *5·2*, *5·11*
See also B9; CCC; 'Ethrel'; Gibberellins; Morphactins
Growth substances
effect of CCC and glycine betaine on bean, *5·18*
in tomato roots infected with nematodes, *5·13*, *5·18*
in wheat, 101
production of, by *Azotobacter*, *4·2*
Zanthophylls and, 122
See also Auxin; Cytokinins; Gibberellins

Hay. *See* Mouldy hay
Heavy metals, retention of, in soils, 70
Heptachlor, for Wheat Bulb fly, 195
Herbicides
adsorption of, by soil, 60
amino-triazole, 268
anilines and substituted ureas, 60
Aspergillus in decomposition of, 83
'Asulox' for docks, 269
barban for cereals, 60, 262
behaviour in soils, 38
'Betanal' on sugar beet, 292
breakdown in soil, 60
carbamates for sugar beet, 60
CMPP, 292
damage from residues in soil, 59
damage to beans, 59, 260
damage to sugar beet, 292
degradation of, by fungi, 83
dinoseb for beans, 60
diquat, 260, 264
disulfoton, effect on soil fauna, 217
diuron, 60
effect of drift from, 292
for weeds in carrots, 267
for weeds in cereals, 58, 137, 260, 262
for weeds in potatoes, 264
for weeds in sugar beet, 292
linuron, 60, 264, 267
linuron/paraquat as spray for potato, 264, 268
MCPA, 292
MCPB, 292
metoxuron for cereals, 60
monolinuron for beans, 60
monuron, 60
'Murbetex' for sugar beet, 292
persistence in soil, 60
'Pyramin' for sugar beet, 292
soil organic matter and adsorption of, 60
tillage systems and, *1·3*
time of application to sugar beet, 292
trifluralin, 60, 292
Herefordshire, soil survey in, 304
Herringswell Rotation Experiment, Broom's Barn, 277–279
Hessle Tills, parent material of soils, 68
Highfield
cereals on, 251–253, 261, 263
potatoes on, 254–255
viruses on sugar beet, 129
Honeybees (*Apis mellifera*)
acute bee-paralysis virus, 228, *7·12*, *11·6*, *11·8*, *11·10*
brood rearing, effect of colony size on, *11·21*

https://doi.org/10.23637/ERADOC-1-123

This work is licensed under a Creative Commons Attribution 4.0 International License.

Honeybees (*Apis mellifera*) (*contd.*):
choice of flower species, *11·15*, *11·19*
chronic bee-paralysis virus, 227, *7·12*, *11·8*, *11·9*, *11·10*
colonies, size of, 223, 226, *11·21*
control of wax moths with *Bacillus thuringiensis*, *11·11*
dandelion as competitor to fruit trees for visits, *11·15*
danger from sprays, 201
dysentery, *11·7*
flight room for, 223
food consumption, effect of colony size on, *11·21*
foraging, effect of colony size on, 226
2-heptanone in mandibular glands, 225, *11·22*
hive space, 223
hypopharyngeal glands, *11·10*, *11·23*
insecticide toxicity, 187–189, 191, *9·2*, *9·13*, *9·24*
iso-amyl acetate in sting pheromone, 225, *11·22*
longevity in winter, effect of colony size on, 224, *11·21*
Nassanoff glands, 175, 225, *9·9*, *11·12*
Nosema apis on, *11·7*
on oil-seed rape, 188, 226
pathology of, *11·1*
pheromones of, 175, 224, *9·10*, *11·12*, *11·13*, *11·22*
physiology of, 223
pollination by, 226–227, *11·14*, *11·16*, *11·17*, *11·18*, *11·20*
queen piping, 223–226
queen's inhibitory scent, *11·13*
sacbrood virus, 229, *11·6*, *11·8*
smoke for subduing, 224
sucrose, denatured, for feeding, 224
'summer' and 'winter' bees, *11·23*
swarming, 223
virus diseases, 227–229, *11·6–11·8*, *11·10*, *11·16*
wasps as predators, 227
winter survival of colonies, 224, *11·21*
Hoos Barley, 248
modifications in 1968, 247, 251
Hoosfield, 138, 260
Housefly. *See Musca domestica*
Huntingdonshire, soil survey in, 303

IBDU (Isobutylidene diurea)
compared with ammonium nitrate, 42–43
for Sitka spruce seedlings, *2·3*
in forest nurseries, *2·5*
Infra-red gas analyser, 32, 33, *1·4*
Insect survey at Rothamsted, 205–214
Insect traps
for aphids, 129, 208–214, 272, *10·25*, *16·10*
height of, 208–209
light traps, surveys with, 214
monthly catches in, 205, 206, 208
moths caught in, 214
pitfall traps, 216, 221
reporting service as standard for warning system, 207
sticky, 209
suction, 207–209
Insecticides
5-benzyl-9-furylmethyl chrysanthemates and analogues, 181
diffusion of, in soil, 191, *9·16*
effect of watering on effectiveness, 191–192
effect on earthworms, 217
effect on parasitic and predatory insects, 189
effect on pollen beetles, 188, 263
effect on soil fauna, 216–219
effect on sugar beat, 274–275
emulsifiable concentrates, 188
Insecticides (*contd.*):
for sheep maggot fly, 265
for warble fly on cattle, 269
granular, 187, 191
leaching from soil, 217
losses of, from treated seed, 193–194
'LOVO' to reduce losses, 184–186
metabolism by insects, 171, 178
microencapsulation, 187, *9·3*
organochlorine, replacements for, 171, 194–195
organophosphorus, 171–174, 187, 191, 192, 216–218
penetration into insects, 177–179, *9·8*, *9·20*
polarography of, 192
pyrethrins, 171, 175–184, 185
rain washing, persistence to, 184–185
resistance of insects to, 171–174, *9·20*, *9·22*, *9·23*
secretion into nectar, *9·21*
seed dressings, efficiency of application, 193, *9·15*
single-row trials, 195
sorption by insects, *9·8*, *9·20*
sorption by soil, 190
systemic, 190–192, *9·16*, *9·21*
timing of sprays on Wheat Bulb fly, *9·17*
toxicity to honey bees, 187–189, 191, *9·2*, *9·13*, *9·24*
toxicity to houseflies, 180–184, *9·20*, *9·22*, *9·23*.
toxicity to *Phaedon cochleariae*, 178–183
volatilisation of, 184
See also individual insecticides; Aphicides
Insecticides, apparatus
atomiser heads, 189
counters, portable, 189, *9·5*
insect aspirator, 189
sieve, variable, 189
spore-trap turbine, 189
suction sampler, 188, 189
valve, gas–liquid control, for slurry, 189, *9·4*
Insects
census of pests in Europe, *10·7*
distribution of, edge infestations, 216
distribution of, effect of shelter on, 215–216
effect of windbreaks on flight, 215, *10·10*
effect on plant growth, 199–207
list of species reared, 192–193
migration, *10·1*, *10·21*
nervous system, effect of pyrethrins on, 175–178
nervous system, staining of, 190
sex attractants in, 195
Intensive Spring Barley Experiment, 137, 253
Intensive Winter Barley Experiment, 138
International Biological Program (IBP), 82, 91, 118, *6·10*
Iron in soils, 80
Iron oxides, formation of, 68–69
Irrigation
effect on nematodes, 159, 160
effect on net assimilation rate, 98
effect on potato scab, 148, *7·21*
effect on potato yields, 36
effect on soil fauna, 219
effect on sugar content of sugar beet, 98
evaporation and, 36
on barley, 37
on beans, 36, 254, 257, 261
on grass, 264
on potatoes, 36
on sugar beet, 98, 288, 291
Irrigation Experiment, 254, 261

Kale
effect of sodium on, *2·12*
microclimate in, 31
soil aeration and respiration under, 34–35

https://doi.org/10.23637/ERADOC-1-123

This work is licensed under a Creative Commons Attribution 4.0 International License.

Kaolinite, deflocculation of, 75
Kent, soil survey in, 306
Knotgrass. *See Polygonum aviculare*
Krilium, effect on sugar-beet growth, *2·20*

Lancashire, soil survey in, 300
Lannate
as nematicide on sugar beet, 274, 275, 281
effect on plant vigour, 281
effect on sugar beet in the field, 283
effect on sugar-beet seedlings, 274, 275
solutions and granules, 282
Leaf-area index of sugar beet, *5·10*
distribution of, in crops, *5·12*
effect of irrigation on, 98
effect of light on, 99
effect of shading on, 97–99
Leaf area of plants, humidity on, 94
Leaf extracts, 75–77
o-quinones and, 117, *6·32*, *6·33*
ribonucleases in, 112, 114–115
Leaf lipoxidase, 114
Leaf protein, 117–121, *6·10*, *6·13*, *6·18*, *6·19*, *6·23*
adducts, 117
air-drying of, 120
amino acids in, 120
by-products of, 118, 121
changes in, during storage, *6·3*
changes in, related to photosynthesis, *5·11*
composition of dry matter and liquor, 121
content of grass, 52–53
digestion with fungal amyloglucosidases, 121
digestion with papain, 120, *6·26*
effect of fertilisers on, 53
effect of simazine on, 119
extracted fibre as food for sheep, 121
extraction units used abroad, 112, 118
freeze-drying of, 119
from by-products of crops, 119
lipid extraction, *6·25*
nutritive value of, *6·24*
press (laboratory scale) for extracting juice, *6·28*
production of, 118, *6·22*
pulper (laboratory scale) for leafy material, *6·27*
release of, from pulped leaves, *6·2*
research in the International Biological Program, *6·10*
yields, 119
Leghaemoglobin of nodules, 90, 91, *4·3*
Legumes and Barley Experiment, 256–257
Lepidoptera, migration of, 214–215
Leptohylemyia coarctata. *See* Wheat Bulb fly
Ley Arable Experiments at Rothamsted
barley as first and second test crops, 267
barley yields on, 252–253
changes in cropping, 1968, 251–252
grazing on, 267
herbicide adsorption on, 60
oats in, 263
potato in, 254–255, 261
wheat yields on, 251–252
Leys. *See* Grass
Lias sediments, geochemistry of, *3·3*
Liming, 268
Little Knot, 46–47, 84, 106, 137, 139
Livestock
on Broom's Barn farm, 297
on Rothamsted farm, 264–265
on Woburn farm, 269
statistical experiments on, 238
Loess, radiocarbon dating of, 68
Lolium perenne. *See* Ryegrass
Lotus corniculatus, bacteroids in nodules of, 89
Lotus hispida, bacteroids in nodules of, 89
Lotus uliginosus, bacteroids in nodules of, 89
Lucerne (*Medicago sativa*)
aphids on, 203
effect of weeds on yield, 203
inoculation with Rhizobia, 91
nitrogen fixation by, 48, 91
Verticillium wilt on, 203
virus diseases of, 203

Magnesium
content of sugar beet, 288
deficiency in light soils, 38, 53–55
effect of treatments 1876–1927 on soil content, 54–55
effect on yield and crop composition, *2·12*
exchangeable, effect of fertiliser residues on, 54–55
fertiliser on light soils, 38, 54–55
for grass/clover ley, 54
for potato, 149
for sugar beet, 287–288, *16·7*
for wheat, 53–55
in Garden Clover soil, 250
residual effect of, 54
take-all and, 139
Magnesium–aluminium hydroxides, *3·2*, *3·4*
Maize (*Zea mays*)
effect of phorate on yield, 201, *10·30*
frit fly on, 201, *10·30*
Malaoxon, resistance of housefly to, 173
Malathion
against pollen beetle on rape, 263
effect on foraging bees, 188
resistance of housefly to, 172
Manganese, in clover seedlings, 115
Mangold clamps, aphid infested, 272
Mangold fly, control of, 274
Mayweed (*Tripleurospermum maritimum*)
in spring barley, 137
linuron for control of, 267
Medicago sativa. *See* Lucerne
Medicago truncatula, nodules of, 90
Menazon seed dressing as aphicide, *16·2*, *16·8*
6-mercapto-purine, for sterilising nematodes, 156
Metaldehyde, effect on pasture productivity, 222
Methyl bromide
as soil sterilant for nematodes, 141, 157, 164
bromine content of wheat after application, 71
effect on eyespot and take-all of wheat, 141
effect on mineralisation of soil nitrogen, 71
effect on nitrification in soil, 71
effect on potato yield, 157
scorching of wheat by, 71
Micas, 63–66
Microbial decomposition of pesticides, 83
Microclimate, techniques for measuring, 31
Micropolyspora faeni, cause of Farmers' lung disease, 132
Millipede (*Blaniulus guttulatus*), sugar-beet seed damage by, 274
Mineralogy, 63–69
'Mobam', effect on sugar-beet seedlings, 275
'Mocap', effect on sugar-beet seedlings, 275, 282
Morphactins, effect on potato, 104
Moths, immigration of, *10·22*
Mouldy hay, 132
Musca domestica (Housefly)
genetic mutants, 172
insecticide toxicity to, 180–183, *9·20*, *9·22*, *9·23*
metabolism of organophosphorus insecticide by, 171
resistance to insecticides, 171–175
synergism in, 172
Mustard beetle. *See Phaedon cochleariae*
Myzus persicae. *See* Aphids

https://doi.org/10.23637/ERADOC-1-123

This work is licensed under a Creative Commons Attribution 4.0 International License.

National Agricultural Advisory Service, 187, 195, 207, 236, 237, 238, 315, 317
National Coal Board, soil survey for, 315
National Environment Research Council Unit for Experimental Cartography, 318
National Institute of Agricultural Botany, 276
National Institute of Agricultural Engineering, 193
National Research Development Corporation, provisional patent filed by, 189
Nematicides
  application methods, 156–159, 168–169
  effect on nematode numbers, 279
  on different soil types, 157–158, 166–168
  residues in potato tubers, 159
  time of application, 168–169
  See also Soil sterilants; and names of chemicals used as nematicides
Nematodes
  antibody production, *8·21*
  attacking coffee, tea and cocoa, *8·9*
  attraction to plant roots, 166
  cereal cyst, 141, 161, 169
  cereal root-knot, 155, 162–164, *8·2*, *8·22*
  classification, *8·5*, *8·6*
  clumping, *8·20*
  control, 157, *8·8*, *8·9*
  cuticle, 152
  cyst nematodes, 152–162
  cyst walls, composition of, 152, *8·11*
  distribution of, *8·8*
  ectoparasitic, 166, *8·16*
  effect of amino-triazole on, 165
  effect of crop rotations on, 159, 162
  effect of cropping on, 279
  effect of 2,4-D on infested cereals, *8·19*
  effect of nitrogen on, 161–162
  effect of rainfall on, *8·16*
  effect on cereals, 161–164
  effect on sugar beet, 166–169, 271, 277–283
  endoparasitic, *8·16*
  fertilisation of, 153–156
  fertility, 156, *8·12*
  films of, 170
  galls, *8·18*
  giant cells, 163
  growth substances in infected roots, *8·18*
  hatching factor, 153
  hatching of, 156–157, 163
  host-parasite relationships, *8·2*
  hybridisation of, 155
  identification of, *8·5*, *8·6*
  incubation, effect on larvae, 163
  inter- and intraspecific differences in, *8·21*
  irrigation, effect of, 159, 160
  mating behaviour, 153–157
  mating between species, 155
  Mexican cyst, 153, 154
  needle, 166
  on various crops, 166–168
  Osborne's cyst, 155
  pathotypes, 155, 161, *8·7*
  population changes, 162, *8·7*
  potato cyst, 149, 152–161
  quarantine measures for, 152, *8·8*
  radiation, effect of, 156
  reproduction, *8·1*
  resistant plants, 155, 159–160, *8·17*
  root lesion, 164–169
  round cyst, 155
  sampling methods, 162–163
  sex attractants, 153–156, *8·14*
  sex determination of, *8·3*
  soil moisture, effect of, *8·16*
  soil structure, effect of, *8·16*
  soil temperature, effect of, 163
  soil type, effect of, 277
Nematodes (*contd.*):
  sterilisation by chemicals and radiation, 156
  stylet and body length, *8·13*
  techniques in handling, *8·4*
  tomato root-knot, 197
  trap cropping, 161
  Verticillium wilt and, 157
Nematodes, specific names of
  Aphelenchus spp., 279, *8·12*, *8·13*
  Ditylenchus spp., *8·21*
  Ditylenchus dipsaci, 262, *8·19*, *8·20*
  Enchodorella spp., *8·15*
  Hemicycliophora spp., 279
  Hemicycliophora typica, 166
  Heterodera spp., 170, *8·16*, *8·21*
  Heterodera avenae, 141, 153, 154, 161, *8·16*
  Heterodera carotae, 153, 154
  Heterodera cruciferae, 153, 154
  Heterodera glycines, 153, 154
  Heterodera goettingiana, 153, 154, *8·16*
  Heterodera rostochiensis, 149, 152–160, *8·1*, *8·3*, *8·7*, *8·11*, *8·14*, *8·16*, *8·17*
  Heterodera schachtii, 152, 153, 282, *8·14*, *8·16*
  Heterodera tabacum, 153, 154, 155
  Heterodera trifolii, 153, 154
  Heterodera virginiae, 155
  Longidorella spp., *8·15*
  Longidorus spp., 167, 271, 277, 279, *8·16*
  Longidorus attenuatus, 168, 169, 279
  Longidorus caespiticola, 166
  Longidorus elongatus, 166
  Longidorus leptocephalus, 166
  Meloidogyne spp., *8·2*, *8·18*, *8·22*
  Meloidogyne arenaria, 155
  Meloidogyne hapla, *8·22*
  Meloidogyne naasi, 162, 163
  Paratylenchus sp., 167, *8·13*
  Paratylenchus bukowinensis, 166
  Paratylenchus microdorus, 166
  Pratylenchus spp., 164, 167, 279
  Pratylenchus fallax, 164, 165
  Pratylenchus minyus (formerly *P. neglectus*), 149, 164–165
  Pratylenchus thornei, 164
  Thornedia spp., *8·15*
  Trichodorus spp., 279–282, *8·16*
  Trichodorus cylindricus, 166
  Trichodorus pachydermus, *7·15*
  Trichodorus primitivus, 166
  Tylenchorhynchus spp., 279
  Tylenchorhynchus brevidens, 168
  Tylenchorhynchus dubius, 166, 168
  Tylenchorhynchus icarus, 168
  Tylenchorhynchus maximus, 166
  Xiphinema, *8·16*
Neutron moisture meter, 34
'Niagara 10242' (furadan), 282
Nitrate
  in crops, 49–51, *2·23*
  in drainage water, 49, 51, 52
  leaching of, by rain, 52
Nitrification, in soil, 82
Nitrification inhibitor, 2-chloro-6-(trichloromethyl)-pyridine, 44, *2·18*, *2·23*
Nitrifiers, isolation of, 82
'Nitro-Chalk'
  compared with ammonia, 38, 41
  for barley, 41
  for grass, 264
  for lucerne, 91
  for Sitka spruce seedlings, *2·3*
  for spring wheat, 41
Nitrococcus, 82
Nitrogen fertilisers, 38–53
  effect of soil fumigation on need for, 280
  effective area fertilised, 40
  efficient use of, 38

https://doi.org/10.23637/ERADOC-1-123

This work is licensed under a Creative Commons Attribution 4.0 International License.

Nitrogen fertilisers (*contd.*):
for barley, 41, 43, 50, 137–138, 161, 248–249, 256, 294–295
for beans, 257
for clover, 48
for grass, 38–43, 47, 51–53, 91, 264, *2·28*
for lucerne, 48, 91
for potatoes, 51
for ryegrass, 91, *2·19*
for sugar beet, 50, 284–285
for wheat, 41, 44–47, 49, 138, *2·18*
forms of, related to water, 44
interaction with CCC on cereals, 102–104
leaching of, 49, 51, 52
liquid, 39–42
residues of, effect on yields, 43–44
with formalin on cereals, 45–47
See also Ammonia; Ammonium; IBDU; 'Nitro-Chalk'; Urea
Nitrogen fixation, 82, 89, 91, *4·1*
Nitrogen in plant material, 60–61
Nitrogen in soil
available, effect of leys on, *2·17*
available, effect of management on, *2·10*
available, effect of previous cropping on, *2·19*
effect of 'DD' on, 278, 279
effect of formaldehyde on, 72
effect of formalin on, 45–47
leaching of, 51
mineralisable, effect on leys, *2·17*
Nitrosomonas, 82
Nodulation
effect of day-length and light intensity on, 87
effect of root temperature on, 88
Nodule bacteria, infection of root hairs, 170
Nodules
bacteroids in, 90, *4·3*
leghaemoglobin of, 90, *4·3*
of subterranean clover, 88
peroxidase activity in, 91, *4·3*
structure of, 90
Norfolk, soil survey in, 303
Northumberland, soil survey in, 302
Nottinghamshire, soil survey in, 304
Nuclear magnetic resonance, for measuring water content of soil, 34

Oak apple, *n*-alkanes of, *9·11*
Oats
Agrostis gigantea in, 256
effect of CCC on, 102–103
lodging of, 102–103, 263
nematodes on, 166, 168
undersown with trefoil, 256
virus diseases of, 130, *7·22*
yields, 263
Oil palms, on acid sulphate soils, *3·1*
Olpidium brassicae
systematics of, *7·10*
transmission of virus to plants by, 125, *7·11*, *7·19*
Oospora pustulans on potato, 141–146, 150
Ophiobolus graminis. *See* Take-all
Organic carbon in soil, 73
Ornithopus sativus, bacteroids in nodules of, 90
Oscinella frit. *See* Frit fly

Paraquat
effect on earthworms, 218
for crops, 260, 262, 264, 267, 269
for stubble, 259, 260, 262, 268
on Broadbalk, 260
slit-seeding and, 218
Parathion
effect on earthworms and wireworms, 217
effect on predators of frit fly, 221
resistance of housefly to, 172
Park Grass
changes in flora of, 110
isolation of nitrifier from, 82
radiocarbon dating of organic matter on, 73
Parklands, 39
Pastures Field, 46, 47, 139
Patent on gas–liquid flow control valve, 189
Peas (*Pisum sativum*)
aphids and virus diseases of, 204
diamine oxidase in seedlings, *6·4*, *6·5*, *6·29*
Peltier effect psychrometer, 34
Pembrokeshire, soil survey in, 309
Phaedon cochleariae (Mustard beetle)
effect on radish and turnip yield, *10·31*
effect on plant growth, *10·3*
leaf injury by, *10·31*, *10·32*
toxicity of insecticides to, 178–184
Phlogopite, 64–66
Phoma spp. on potato, 141, 142, 142–146, 150
Phorate
effect on frit fly, 201, *10·30*
effect on soil fauna, 217
for controlling aphids on beans, 191, 263
on sweet corn, 201
secretion into nectar, *9·21*
toxicity to honey bees, 187
'Phosdrin', 222
Phosphate fertilisers
comparison of nitrophosphate, potassium metaphosphate, Gafsa rock phosphate, basic slag, superphosphate and dicalcium phosphate, *2·21*, *2·22*
effect on arable crops and grass, 284–285, *2·21*, *2·22*, *2·28*
evaluation of, *2·21*
for sugar beet, 284
residual value of, *2·22*
Phosphate in soil, rate of release of, *2·27*
Phosphorus in soil extracts, automatic determination of, *2·24*
Photosynthesis
effect of di-methyl silicones on, 33
effect on virus synthesis, 117
measurement with phytometers, *5·12*
of semi-dwarf wheats, 95
of single leaves, 33
rates of, 95
related to changes in leaf protein, *5·11*
Phytophthora infestans on potato, 141
Picea sitchensis. *See* Sitka spruce
Pigments, effect on plant growth, 123
Pigmy mangold beetle, sugar-beet seed damage by, 274
Plant nutrients, cation-anion relationships *2·16*
Plant Pathology Laboratory, 193
Plant residues in soil, 75
Plutella maculipennis
effect on radish and turnip yield, *10·31*
effect on plant growth, *10·3*
leaf injury by, *10·32*
Podsolisation, 75
Podsols, iron and organic carbon in, *17·8*
Polygonum aviculare (knotgrass), 110, 137
Polygonum convolvulus (black bindweed), 110
Polyphenols, 76, 77
Potassium fertiliser
for arable crops and grass, 52–53, 247, 284, *2·12*, *2·28*
residual effect of, 55
Potassium in soils
and clays, *2·11*
release from micas, 63
release to ion-exchange resins, 55
reserves in Rothamsted soils, *2·25*
reserves in soils from different parent materials, *2·26*

https://doi.org/10.23637/ERADOC-1-123

This work is licensed under a Creative Commons Attribution 4.0 International License.

Potato
aphids on, 264
axillary branches of, 100
black scurf (*Rhizoctonia solani*), 141–145, 147, 150
blight (*Phytophthora infestans*), 141, 171, 196–197, 259, 264
burning to control weeds in, 260
Cephalosporium sp. on, 150
coiled sprout, 146
common scab (*Streptomyces scabies*), 141, 147–149, 196, 197, 198, *7·21*
compensatory growth of, 142, 143
Cylindrocarpon on, 150
dry rot (*Fusarium caeruleum*), 141
effect of CCC on, 157
effect of morphactins on, 104
fertilisers on, 247, 249, 254, 255
fumigation of, 150
fungicides for, 142, 144, 171, 196–198
fungus diseases of, 128, 141–150, 196–198, 264
fungus diseases of, control of, 144–146, 196–198, 264
fungus diseases of, effect of heat treatment on, 145
fungus diseases of, effect of soil moisture on, 147
gangrene (*Phoma* spp.), 141–146, 150
irrigation on, 36, 148, 149, 159, *7·21*
leaf dropstreak on, 261
magnesium deficiency, 149, 256
nematicide residues in tubers, 159
nematode-resistant, 159, 160
nematodes on, 149, 153, 154, 157–161, 166–168
nitrate in sap of haulms, 51
nitrogen fertilisers on, 51, 147, 247
on Broadbalk, 247, 259–260
pathogen-free tubers, 145
pathogenic fungi, measurement of prevalence, *7·17*
phosphate fertiliser on, *2·22*
powdery scab (*Spongospora subterrenea*), 128, 141
silver scurf (*Helminthosporium atrovirens*), 145
skin spot (*Oospora pustulans*), 141–145, 150
slugs, susceptibility of varieties to, 221
soil sterilants on, 150, 267
stem cuttings, 145
taint from fumigation with 'D-D', 161
tuber blight, 197
Verticillium spp. on, 146, 149, 150, 157
varieties, diseases of, 141–148, 157–159, 261, 264
virus diseases of, 124, 126–129 261, *7·15*
weeds in, 260, 264
yields, 143–144, 150, 157–160, 254–256, 260–261, 264, 269
Potato Marketing Board, 141, 237
PP 511, 282
Previous cropping
effect on yields, 43, *2·19*
Protein, in *Septomyxa affinis* spores, 118
See also Leaf protein
Pyrethrins and related compounds, 175–184, *9·14*
Pyrethroids (synthetic), 178–184
Pyridoxal, oxidation of, by pea-seedling extracts, *6·29*
Pyrites, oxidation of, in soil, *3·1*
Pyrohydrolysis, separation of fluorine from alumino silicates by, 79
Pythium sp.
on field beans, 141
on potato, 150

o-Quinones, 117, *6·32*, *6·33*

Radiobiological Research Laboratory, Wantage, 34
Radiocarbon dating
of glacial deposits and loess, 68
of soil organic matter, 73
Radiometry, 34
Rape, oil-seed (*Brassica napus*)
as break crop, 256, 263
insecticide for pollen beetle on, 263
insecticide poisoning of bees on, 188
pollination of, by bees, 226, *11·20*
Raspberry, pollination by bees, *11·16*
Residual Phosphate Experiments, yields, 253–255
Rhizobium trifolii, 86–90
Rhizoctonia solani on potato, 141–145, 147–150
Rhizosphere, micro-organisms in, 83
Ribonucleases in leaf extracts, 112, 114
Ribonucleic acid (RNA), 124–127
Roots
distribution in soil, 97
effect of CCC on growth, 103
effect of compacted soil layer on, 97
effect of shading on growth, 96
growth, methods of measuring, 95, *5·16*
sampling equipment, *5·9*
soil volume used by, *2·14*
Rotation experiments at Broom's Barn, 292–295
Rotations
on Broom's Barn farm, 295
on Rothamsted farm, 262
on Woburn farm, 268
Rothamsted Insect Survey, 205–214, *10·13*
Ryegrass (*Lolium perenne*)
composition of, 52
effect of nitrogen fertilisers on, 42, 52–53, 91
effect of phosphate fertilisers on, 52–53, *2·21*
effect of potassium fertilisers on, 52–53
nematodes on, 279
See also Grass

Sawyers Field, potato yields on, 254–255
Saxmundham
barley at, 45–46
efficiency of nitrogen fertiliser at, 47–48
Intensive Wheat Experiment at, 49, 138
nitrate in crops at, 49–52
nitrate in drainage water at, 49, 51–52
nitrogen fertilisers on wheat at, 49
Scout Farm, 199, 200, 262, 265
Sesamex, 173
Sewage sludge, contamination of plants and soils, 70, *3·7*
Shading
effect on couchgrass, 109
effect on net assimilation rate, 97
effect on root growth in barley, 96
effect on sugar-beet, 97
'Tygan' screencloth for, 96, 98, 109
Shropshire, soil survey in, 304
Silicate analysis for major elements, 77
Silicate minerals
aluminium in, determination of, *3·6*
calcium in, determination of, 79
Silicates
fluorine in, determination of, 79, *3·9*
for barley, 248
Simazine
adsorption by soils, 59, *2·29*
effect of fertilisers on, 59
effect of soil moisture on, 59
effect of soil organic matter on, 59
effect on beans, 59, 248–249, 254, 260, 261, 263, 267, 268
effect on leaf-protein yields, 119
effect on weeds on Broadbalk, 110

https://doi.org/10.23637/ERADOC-1-123

This work is licensed under a Creative Commons Attribution 4.0 International License.

Sitka spruce (*Picea sitchensis*)
calcium fertilisers for, 56–57
copper-containing enzymes in, 116
copper deficiency in, 57, 116
formalised casein for, *2·3*
nitrogen fertilisers on seedlings, *2·3*
seedlings, diseases of, 151
sulphur deficiency in, 56–57
Slit-seeding, paraquat and, 218
Slugs, *10·12*
effect of paraquat and slit seeding on, 218
potato varieties susceptible to, 221
toxicity of contact poisons to, *9·18*, *9·19*, *10·26*, *10·27*
Sodium fertilisers
effect on kale and barley, *2·12*
residual effect of, 55
Soil aeration, 34–35
Soil aggregates, effect on nutrients used by roots, *2·13*
Soil classification, 311, *17·6*
Soil compaction
coiled sprout of potatoes and, 146
effect on response to fertilisers, 289
effect on root growth, 97
effect on sugar-beet yield, 289
Soil conditioners, effect on sugar-beet growth, *2·20*
Soil fauna, 216–219
effect of insecticides on, 216–218, *10·17*
effect of irrigation on, 219
effect of paraquat and slit seeding on, 218
effect of temperature on, 219
effect on turnover of soil nutrients, *10·6*
methods of extraction, *10·19*
micro-arthropods, effect of agricultural practice on, *10·18*, *10·20*
Soil fumigation. *See* Soil sterilisation
Soil groups, distribution of, 310
Soil identification, 310
Soil linear fabric analysis, 311
Soil map users, 314
Soil mapping
new concepts, 318
new principle of, 298
Soil micromorphology, 310, 311
Soil moisture, apparatus for measuring, 34
Soil moisture, effect on potato scab, 149
Soil moisture, movement of, *1·8*
Soil organic matter
effect on determination of ferrous iron in soils, 80
effect on sorption of insecticides, 190
mineralisation of, 72
radio-carbon dating of, 73
trace-element reactions with, 74
Soil particle size distribution, *17·7*
Soil respiration, 34, 72
Soil sampling, 314
Soil series, 298–311
New series
Aldeby, 303
Beccles, 303
Hall, 303
Warmley, 307
Waveney, 303
Yate, 307
Soil sterilants
chloropicrin, 150, 165, 267
dazomet, 140, 157–159, *7·13*
'D-D', 157–161, 278, *7·13*
formaldehyde, 72
formalin, 84, 140
methyl bromide, 71, 72, 141, 157, 164
'Telone', 169
See also Aphicides; Nematicides; and names of chemicals used as sterilants
Soil sterilisation
effect on agricultural crops, *7·1*
effect on nematodes, 157, 161, 164, 279, 280
effect on N fertiliser need by sugar beet, 280
effect on N mineralisation, 71, 278–279
effect on sugar-beet yields, 277, 278
for cereals, 71, 72, 139–141, 164–166, *7·13*
for potatoes, 150, 267
nutrition of conifers and, *2·2*
residual effect of, 278
scorching of plants by, 71, 72
Soil surveying
air photography in, 318
storage of data, 314
Soil surveys
in Buckinghamshire, 305
in Cambridgeshire and Isle of Ely, 302
in Cardiganshire, 309
in Cheshire, 301
in Derbyshire, 304
in Devonshire, 308
in East Anglia, 302
in Ely, Isle of, 302
in Essex, 305
in Gloucestershire, 306
in Herefordshire, 304
in Huntingdonshire, 303
in Kent, 306
in Lancashire, 300
in Norfolk, 303
in Northumberland, 302
in Nottinghamshire, 304
in Pembrokeshire, 309
in Shropshire, 304
in Wales, 309
in Westmorland, 300
in Worcestershire, 304
in Yorkshire, 298
of Broadbalk, 316
of Paignton, 315
of Parr Moss, 315
Soyabean (*Glycine max*)
nodules of, 90, 91
symbiosis in, 87
Spectroscopy, of soil contaminated with heavy metals, 70
Spongospora subterranea
on potato, 141
potato mop top virus and, 128
Spore traps, 189, 285
Stackyard Field, 201
Statistical analyses
canonical, 236
classification methods, 236, 238
crop experiments, 238
discriminant, 236
fertiliser response of potato, 238
fertiliser usage, *12·2*, *12·3*, *12·8*
for silicates in major elements, 77
livestock experiments, 238
National Agricultural Advisory Service, 236–238
nitrogen response curve, 238
of rates of volatilisation of insecticides, 184
of sulphate leaching in latosols, 58
potato, fertiliser response, 238
Potato Marketing Board survey, 237
principal co-ordinates, 236
regression, 236
routine analysis, 237
statistical service for other institutes, 236, 240, 243
Survey of Fertiliser Practice, 236
time series, 236
type-of-farming map, 237
Statistical programming
algorithms, 233, *12·7*, *12·13*, *12·15*

https://doi.org/10.23637/ERADOC-1-123

This work is licensed under a Creative Commons Attribution 4.0 International License.

Statistical programming (*contd.*):
canonical correlation, 233
cluster analysis, 235, *12·13*
General Factorial Program, 233, 235
General Survey Program, 233, 242
GENSTAT, 234
graphical presentation, 233
minimum spanning tree, *12·13*
multidimensional arrays, *12·5*
polynomial regression, 233
principal components analyses, 233
programming languages, 234–235
summary program, 233
Statistical theory
angular transformations, 235
classification, *12·6*, *12·14*
cluster analysis, 235, *12·7*
design of experiments, *12·10*, *12·11*, *12·12*
maximum likelihood, 235
minimum spanning tree, 235, *12·7*
missing values, 235
multivariate analysis, *12·4*
ordination analysis, 235, *12·6*
Stomatal resistance of leaves, 32
Stored products
actinomycetes in, 132–133
hazards to health from, 132–133
moulds on, 132
Straw
length, effect of CCC on, 102–103
yields, 261
Strawberries, pollination of, by bees, *11·16*, *11·18*
Streptomyces scabies on potato, 141, 147–149, 196–198, *7·21*
Subterranean clover (*Trifolium subterraneum*), 88, 170
Suction traps. *See* Insect traps
Sugar beet
agricultural salt for, 284, 287, 288, 289
aphids on, 270–273, *16·2*, *16·3*, *16·8–16·10*
cover crops, effect on beet yellows, 273
defoliation, effect on yield, 273
Docking disorder, 277–282, *16·1*
See also separate entry
downy mildew (*Peronospora farinosa*), 275, *16·5*
effect of pesticides on, 274–275, 279–283
effect of previous cropping on, 293
effect of soil compaction on, 289
effect of soil conditioners on, *2·20*
effect of soil type on yield, 289, *5·10*
fanginess, 282
farmyard manure on, 287
fertilisers for, 284, 286–289, 291, 292, *16·13*
fungicides as seed and soil treatments, 275
fungus diseases, 275–276
fungus diseases, *Ramularia* leaf spot, 276
growth on different soils, *5·10*
harvesting date, 291
herbicides for, 292
in rotation with cereals, 292–295
irrigation on, 98, 288, 291
leaf-area index, 97, 99, *5·10*
magnesium fertiliser for, 287–289, *16·7*
nematodes on, 166–169, 271, 277, 279–283
net assimilation rate, 98, *5·10*
nitrate in sap of petioles, 50, *16·13*
plant spacing, 289–291
pollen traps in, 285
Ramularia leaf spot on, 276
root shape, effect of nematicide on, 282
seed damage by millipedes and beetles, 274
seed dressings with pesticides, 274
seed production, 283–285, *16·4*, *16·12*
seed quality, 285
seedlings, effect of light on, 99
shading on, 97
Sugar beet (*contd.*):
soil sterilisation, effect on yield, 277–280
sowing date and plant population, 290
sugar content, 97-99, 277
virus diseases, 127, 129, 270–273, *16·2*, *16·8*, *16·9*, *16·11*
yields, 271, 274, 278, 291
see also Herringswell Rotation Experiment
Sulphate fertilisers
for lupin and radish, 57
for Sitka spruce, 56
Sulphur in air
from industrial fuels, 56
measurement of absorption by leaves, 58
Sulphur in soils
deficiency, 38, 56
determination of, 79, *3·5*
from industrial fuels, 56
leaching, 58
Surface properties of crops
evaporation and assimilation rates and, 32
infra-red gas analyser for studying, 32, 33, *1·4*
mesophyll resistance and, 32–33
stomatal resistance and, 32
resistance of crop canapies, 32, *1·11*
transpiration rate and, 32
Surface properties of leaves, 33
Symbiosis
effect of light on, 87
genetics of, in legumes, 82, *4·1*
Symphylans, damage to corn by, *10·23*

Take-all on cereals, 133–141
after long 'break', 262
bioassay of, 133–136
effect of soil fumigation on, 139–141
effect on wheat composition, 54
fungicides for, 196, 197
growth in soil, 84
'infection index' of, 134, 135
'infective units', 134, 135
infested soils, 134–136
lesions, measurement of, 134
magnesium deficiency and, 54, 139
microbiology of, 84, 137
nematodes and, 169
nitrogen fertilisers and, 138–139
on barley, 137, 138
on High Field, 251–253
persistence in soil, 134
seasonal fluctuations in soil, 136
serological identification of, 137
TBTP (S,S,S-tributyl-phosphorotrithioate), 173
'Telone', 169
'Temik'
as aphicide, 271, 272
as insecticide, 274
as nematicide, 157–159, 165, 274, 280–283
effect on plant vigour, 274
effect on sugar beet, 274–275, 280–283
methods of application, 281
'Terracur', on sugar beet, 275, 282
Thermoactinomyces vulgaris in decomposition of herbicides, 83
Thionazin
damage to sugar-beet seedlings, 282
effect on earthworms and wireworms, 217
timing of sprays on Wheat Bulb fly, *9·17*
Tillage
effect on cereal production, *1·1*
herbicides and, *1·3*
herbicides and, on light and heavy soils, 35
Torquay National History Museum, soil survey for, 315
Trace elements
reaction with soil organic matter, 74
technique for concentration of, *3·8*

https://doi.org/10.23637/ERADOC-1-123

This work is licensed under a Creative Commons Attribution 4.0 International License.

Transpiration, 32
Traps. *See* Insect traps; Spore traps
Trichloronate, timing of sprays on Wheat Bulb fly, *9·17*
Trichlorphon, effect on wireworms and earthworms, 217
Trifolium glomeratum. *See* Cluster clover
Trifolium subterraneum. *See* Subterranean clover
Tryptophan, conversion to auxin in bean leaves, *3·12*, *5·17*, *5·18*
'Tygan' screen cloth for shading plants, 96, 98, 109

Urea, compared with aqueous ammonia on barley, 41

Verticillium spp. on potato, 146, 149, 150, 157
Vicia faba. *See* Field beans
Vicia sativa, symbiosis in, 87
Vigna sinensis, symbiosis in, 87
Viruses, 124–131
aphid transmitted, 129, 202–207
defective strains, of TMV, 127
effect of aphicides on, 203–207, 270–272
effect of changes in metabolism on, 116
effect of cover crops on, in sugar beet, 273
effect of light on, 117
electron microscopy of, 126
inactivation of, 124, *7·5*
'inclusion bodies' in infected leaf cells, 127
methods of assay, *7·6*
multiplication of, 116
on horseradish, *7·16*
on lucerne, 203
on oats, 130
on sugar beet, 127, 129, 270–272, 277
on wheat, 129–130
photosynthesis and TMV, 117
protein of, 126, *7·8*
purification of chronic bee paralysis, *11·9*
reactivation, 124–125, *7·20*
ribonucleic acid (RNA) of, 124–127
sap-transmissible, *7·16*, *7·22*
satellites of tobacco necrosis, 125, *7·4*, *7·18*
soil-borne, 277, *7·22*
structure of, 125–127
transmission of, by *Olpidium* sp., 125, *7·10*, *7·11*, *7·19*
ultraviolet inactivation of, 124, *7·20*
variability in, 127
virus-like particles, 127
weather, effect on, 128
Viruses, names of
acute bee paralysis, 228, *7·12*, *11·6*, *11·8*, *11·10*
arabis mosaic, *7·16*
barley yellow dwarf, 130, 200
bean leaf roll, 202–204
beet mild yellows, 272
beet mosaic, 127
beet yellows, 129, 270–273, *16·8*, *16·11*
broad-bean mosaic, *7·14*
broad-bean stain, *7·14*
cabbage black ring spot, *7·16*
carrot motley dwarf, 267
cauliflower mosaic, *7·16*
chronic bee paralysis, 227, *7·12*, *11·8*, *11·9*, *11·10*
cocksfoot mottle, 203
cocksfoot streak, 203
cowpea mosaic, *7·14*
cucumber mosaic, 129
henbane mosaic, 128
lucerne mosaic, 203
pea enation mosaic, 204
pea mosaic, 204
potato mop top, 128
potato virus X, 124, 127
Viruses, names of (*contd.*):
potato virus Y, 127
red-clover mottle, *7·14*
sacbrood of bees, 229, *11·6*, *11·8*
satellite virus of tobacco necrosis, 125
squash mosaic, *7·14*
tobacco mosaic, 114, 116, 126, 127, *7·8*
tobacco necrosis, 124, 125, *7·11*, *7·18*, *7·19*, *7·20*
tobacco rattle, 277, *7·15*
tomato black ring, 277
tomato spotted wilt, 126
yellow blotch, 277

Wales, soils, 309, *17·4*, *17·5*, *17·9*, *17·11*
Wasps (*Vespula germanica* and *V. vulgaris*)
foraging of, 227
predators on honey bees, 227
Water vapour
measurement of, *1·5*, *1·9*
stomatal resistance to, in leaves, 32
Watering, effect on wheat given N fertiliser, 44
Waterlogged soil, sulphate reduction in, 74
Weather
effect on aphids, 270
effect on crops, 250, 258, 259
records at Broom's Barn 1968, 380
records at Rothamsted 1967–68, 378
records at Saxmundham 1968, 381
records at Woburn 1967–68, 379
Weeds, 105–110
aphids on, 272
competition with crops, 107, 108, 109
effect of fungicides on, 93–94
Equisetum arvense (horse tail) on Broadbalk, 110, 260
in potatoes, 260, 264
on Broadbalk, changes in growth, 110
perennial grass in cereals, *5·7*
Polygonum aviculare (knotgrass), 110, 137
Polygonum convolvulus (black bindweed), 110
Ranunculus arvensis (corn buttercup), 110
seed dormancy, 106
Tripleurospermum maritimum (mayweed), 137
twitch grass, fallow to control, 262
Veronica hederifolia (ivy-leaved speedwell), 110
wild oats, 94, 109–110, 137, 260, 262
See also Agrostis gigantea; Blackgrass; Couch grass
Wheat
ammonium fertilisers on, 41, 44
anhydrous ammonia and 'Nitro Chalk' for, 41
aphids on, 200, 262
competition with grasses, 107–109
drilling compared with broadcasting seed, 261
effect of CCC on, 102, *5·1*, *5·3*, *5·4*
effect of formalin and nitrogen on, 46, 47
effect of insecticides on plant growth, *9·17*
effect of soil fumigation on, *7·13*
effect of water and nitrogen on, 44
farmyard manure on, 247–250
fertilisers for, 41, 44–49, 54, 138–139, 247–252, *2·18*
formaldehyde, residual effect on, 72
fungicides on, 93–94, 130
growth, comparison with weeds, 108
growth in artificial climates, *5·14*
growth yield of varieties and, *5·15*
growth substances in, 101
in Ley-Arable Experiment, 251
in rotation with sugar beet, 292
lodging, 102, 140
magnesium for, 53–55
Mexican variety, growth and yield of, *5·15*
nematodes on, 161, 162, 164–166
nitrate in sap of, 49
on Barnfield, 249, 260

https://doi.org/10.23637/ERADOC-1-123

This work is licensed under a Creative Commons Attribution 4.0 International License.

Wheat (*contd.*):
on Broadbalk, 247, 249, 259
photosynthesis and translocation in, 95
root growth, effect of CCC on, 103
semi-dwarf, 95
soil sterilants on, 71–72, 139–141, 164
varieties, yields from, 261, 262, *5·15*
virus diseases of, 130
Wheat Bulb fly on, 199, 200, 262
yields, 138, 251, 261–262
See also Cereals; Take-all on Cereals
Wheat Bulb fly (*Leptohylemyia coarctata*)
clumping of eggs, 199
distribution of attacked plants, 199
effect on wheat yield, 199, 262
Entomophthora spp. on, 230
fungus diseases of, 219, 230
insecticides for, 171, 194, 195
odour detection by, 219
on Broadbalk, 247
on permanent reference plots, 219
oviposition of, *10·14*
Phialophora infection on eggs, 219
prediction of effects on yields, 199
seed dressings of insecticides against, 194
Septomyxa affinis and, 118
Strongwellsea castrans on, 230
Tarichium hylemyiae on, 230
timing of sprays on, *9·17*
wheat extracts, response to, 194
Wireworms (*Agriotes* spp.)
effect of insecticides on, 195, 217
sex attractant in, 196
Woburn 265–269
Barley Variety Experiment, 267
cropping at, 268–269
Deep-drilled Fertiliser Experiment, 267
effect of weather on crops, 265
field experiments at, 266–267, *14·1*
Intensive Cereal Experiment, 54, 55, 138, 252, 253, 255, 256
irrigation, 36, 219
Ley–Arable Experiment, 150, 166, 253, 267
magnesium deficiency, 53–55
Market Garden Experiment, 70, 267
nematodes at, 157, 164, 165, 166
nitrogen-fixing experiments, 91
potato growing at, 145, 147, 149, 219
rotations used, 268
take-all at, 134, 136
viruses on sugar beet, 129
Worcestershire, soil survey in, 304

X-ray fluorescence analysis, 77–79
Xanthophylls and plant-growth inhibition, 121

Yorkshire, soil survey in, 298

Zeolite, 66–67
'Zinophos', effect on soil fauna, 218

https://doi.org/10.23637/ERADOC-1-123