632.3 DIS

Index

acibenzolar-S-methyl (ASM), 64, 65, 67, 68, 70, 71, 73, 74, 75, 76, 79, 80, 82 Actigard[®], 64, 76 aerated compost tea (ACT), 94, 109, 110 allocation costs, 78-9 Alternaria alternata, 68, 69, 70 Alternaria solani, 4, 66, 73 Ampelomyces quisqualis, 31, 41, 44 animal manures, 16-17 antitranspirants, 237, 238 appressoria, 237 chemical and topographical signals for induction, 237-8 area under disease progress curve (AUDPC), 146, 151, 167 Aureobasidium pullulans, 41, 45 Bacillus pumilus, 36, 40, 65 Bacillus subtilis, 35, 36, 40, 42, 44, 47 backcrossing, 132, 133, 134-5 bacteriophages, 246-56 challenges for using in disease control, 252-3 control of plant pathogenic bacteria, 246-56 early use in agriculture, 247 part of an integrated management strategy, 253-4recent approaches in plant pathology, 248-52 biofumigation, 172-95 case studies, 186-91 combined with solarization, 206 ecological considerations, 182-3 fate and activity of ITCs in soil, 181-2 field implementation, 184-91 glucosinolate-myrosinase system, 173-4 green manuring, 176 intercrops, 174, 175 ITC release efficiency in soil, 181 maximizing biofumigation potential, 179-80 modes of utilization, 174-6 non-glucosinolate effects, 178 pathogen sensitivity and ecology, 183 rotation crops, 174, 175 seed meals, 175-6 separating GSL effects from other effects of biofumigation, 176-9 toxicity of GSL hydrolysis products, 179 trap crops and non-hosting, 177 biological control, 27-61, 247 application technology, 47

commercial products available and uses, 42-6 competition for space and nutrients, 28-9 factors affecting variable efficacy and commercial development, 46-9 hypovirulence, 34 induced resistance, 32-3 modes of action, 28-34 parasitism and production of extracellular lytic enzymes, 30-32 plant growth promotion, 33-4 post-harvest, 48 production, formulation and application, 34-42 production of antibiotics, 29-30 registration, 47, 48 biological control agents (BCAs), 27, 29, 33, 35 combined with solarization, 207 Bion[®], 64, 74, 75 Blumeria graminis f.sp. hordei, 3, 4, 74, 132 Blumeria graminis f.sp. tritici, 4, 15, 74, 127 Botrytis cinerea, 13, 28, 31, 45, 65, 75, 76, 109 Brassica juncea, 175, 179, 228 chitosan, 64, 68, 72 compost extracts, 93, 94 effects on plant disease, 108-13 production of, 95-6 use of adjuvants, 112 compost teas, 93, 94 aerated compost tea (ACT), 94 effects on plant disease, 108-13 mechanisms involved in disease suppression, 115non-aerated compost tea (NCT), 94 production of, 95 use of adjuvants, 112 composting, 93 aerobic, 94 composts, 93 antibiosis, 113 biological attributes, 106 chemical and physical attributes, 105-6 effects on plant disease, 99-108 induced systemic resistance, 113, 114 inoculation with biological control agents, 108 mechanisms involved in disease suppression, 113-15 predation, 113 production of, 95

suppressive, 107

Coniothvrium minitans, 38, 43 crop losses and plant disease, 1-3 crop rotation, 8-9 cultural control, 3, 7-26 crop rotation, 8-9 fertilizers, 12-16 flooding, 18 host eradication, 7-8 intercropping, 19-20 irrigation, 17-18 organic amendments, 16-17 sanitation, 8 soil amendments and mulching, 12-16 sowing practices, 11-12 suppressive soils, 18-19 tillage, 9-11 disease avoidance/escape, 142 disease control barriers to implementation, 259-60 biologically based approaches, 258-9 disguising the leaf surface, 237-45 durable resistance, 125 ecoagriculture, 258 ecological agriculture, 258 Elexa[®], 64, 72 Enterobacter cloacae, 29, 107 Erwinia amylovora, 28, 106 Erysiphe cichoracearum, 73, 74 ethylene (ET), 32, 63, 64, 82 F₂ progeny method, 136 fertilisers, 12-16 film-forming polymers, 237 disease control, 237-41 Fusarium oxysporum, 28, 99 Fusarium oxysporum f.sp. vasinfectum, 75, 109, 205 Fusarium semitectum, 70, 73 Gaeumannomyces graminis f.sp. tritici, 82, 175 genetic manipulation (GM) technologies, 129, 131 genotype unit area (GUA), 165, 166 Gliocladium virens, 38, 107, 108 glucosinolate (GSL), 172, 173, 174, 176, 225 profiles, 179 toxicity of hydrolysis products, 179 glutathione oxidised (GSSG), 224, 230 reduced (GSH), 224, 225, 228, 230 green manuring, 176 harpin, 64, 68, 70, 71, 72, 73 healthy leaf area duration (HAD), 147, 151 heritability, 142, 143 horizontal resistance, 124 host eradication, 7-8 hydrogen sulphide (H₂S), 225, 226, 227 hypersensitive response (HR), 63, 123, 228

inbreeding crops, 132-7 induced resistance, 32-3, 62-92, 202 allocation costs, 78-9 apple, 67-8 cereals, 74 citrus, 69-70 costs, 78-9 cotton, 75 forestry, 77-8 grape, 71-3 lettuce, 74 melon, 70-71 onion, 73 ornamentals, 75-7 peach, 70 pear, 68-9 pepper, 66-7 potato, 73-4 in practice, 64-78 tomato, 64--6 trade-offs, 80-82 induced systemic resistance (ISR), 32, 62, 64, 113.114 integrated crop management (ICM), 260 integrated pest management (IPM), 173, 174, 204 intercropping, 19-20 intercrops, 174, 175 irrigation, 17-18 isothiocyanates (ITCs), 172, 175, 179, 180 enhanced biodegradation, 183 fate and activity in soil, 181-2 release efficiency in soil, 181 strategies to maximize ITC-related biofumigation, 184-6 jasmonic acid (JA), 63, 64, 80, 82 leaf surface disguising, 237-45 linkage drag, 128 low input agriculture, 258 Magnaporthe grisea, 13, 132 major genes, 123 MAMP-triggered immunity, 130 marker-assisted selection (MAS), 133-4 mass selection, 132, 133, 135 Meloidogyne chitwoodi, 73, 188 Meloidogyne javanica, 177, 178 metham sodium, 173, 205 methyl bromide (MB), 172, 196, 204, 205 methyl jasmonate (MeJA), 75, 76, 77, 80 microbe-associated molecular patterns (MAMPS), 130, 131 Milsana®, 64, 66, 71, 72, 74 minor genes, 123

mixtures, 162–71 double haploid mapping population, 163 efficacy, 164 genotype unit area (GUA), 165, 166

mechanisms of disease control, 163, 164 patchy sowing, 166 trial demonstrations, 163-5 used in practice, 165-7 yield stability, 167 Monosporascus cannonballus, 17, 18, 200, 209 mulching, 12, 196 multigenic resistance, 124 multilines, 164 Mycosphaerella graminicola, 4, 164 Mycostop[®], 38, 42, 43 myrosinase, 174 non-aerated compost tea (NCT), 94, 95, 96, 109, 110 non-host resistance, 125 nucleotide-binding site (NBS) region, 129, 130 nutrient-induced resistance, 221-3 organic amendments, 16-17, 103 organic matter decomposition level, 104 partial backcrossing, 135 partial resistance, 122, 124 particle films disease control, 242 pathogen-associated molecular patterns (PAMPS), 130 pedigree breeding, 134 pedigree selection, 132, 133 Penicillium expansum, 28, 45, 68 phages, 247, 248, 249, 250, 251, 252, 253 phosphorus, 13-14 photosynthesis, 144, 150 compensatory adjustments, 150-52 photosynthetically active radiation (PAR), 144, 145, 149, 150, 151 phytoalexins, 15, 62, 230 Phytophthora capsici, 17, 66, 100 Phytophthora cinnamomi, 16, 77, 102, 104 Phytophthora infestans, 1, 20, 65, 98, 144, 145, 167 Piriformospora indica, 79, 153 plant growth promoting rhizobacteria (PGPR), 33, 34, 63, 77, 247, 253 Plasmodiophora brassicae, 97, 106 Plasmopara viticola, 71, 109 plastic films, 196 polygenic resistance, 124 PR proteins, 62, 67 priming for induced resistance, 62, 64 2-propenyl ITC, 182 protease, 30, 31 Pseudomonas fluorescens, 35, 40, 65 Pseudomonas syringae pv. tomato, 13, 64, 81 Puccinia graminis f.sp tritici, 8, 237 Pythium aphanidermatum, 15, 29, 99, 102 Pythium oligandrum, 32, 33, 38

QTL (quantitative trait locus), 124 qualitative resistance, 124 quantitative resistance, 124 R-gene-mediated resistance, 62 race non-specific resistance, 124 race-specific resistance, 124 radiation use efficiency (RUE), 144, 145, 153 Ralstonia solanacearum, 17, 32, 65, 187, 189 Ramularia collo-cvgni, 148, 152, 153 recurrent selection, 136 resistance breeding methodology and selection strategies for inbreeding crops, 132-7 deployment, 137-8 durable, 125 host plant, 3, 122-41 hypersensitive, 125 multigenic/polygenic, 124 mutation, 131 non-host resistance/immunity, 125 partial, 122, 124 quantitative and qualitative, 124 race-specific and race-non-specific, 124 seedling and adult plant, 123 sources of, 126-32 transgenic, 129 vertical and horizontal, 124 Reynoutria sachalinensis, 64, 74 Rhizoctonia solani, 9, 11, 28, 31, 97, 99, 100, 102, 103, 108, 132, 164, 178, 187, 223, 227 Rhynchosporium secalis, 9, 11, 12, 164, 165 rotation crops, 174, 175 salicylic acid (SA), 62, 63, 68, 71, 77, 80, 82, 229 Sclerotinia sclerotiorum, 9, 18, 43, 227, 231 Sclerotinia minor, 43, 100, 201 Sclerotium rolfsii, 97, 99, 101, 201 Septoria tritici, 4, 14, 15, 74 soil amendments and mulching, 12-16 soil disinfestations, 196 soil solarization, 196-220 combining solarization with fumigants, 205 combining solarization with organic amendments (biofumigation), 206 combining with biocontrol agents, 207 double tarps, 209 increased growth response (IGR) in solarized soil, 203 induced resistance as a mechanism of disease control, 202 implementation and application, 211-12 improvements by intensifying soil heating, 208integrated management, 203-7 mechanisms of pathogen and disease control, 201 - 3methyl bromide crisis, 214 modelling and decision making tools, 207

pathogen and weed control, 199-201

soil solarization (contd.) principles, 198–9 sprayable films, 212 solar heating (SH) of the soil, 196, 202, 211 sowing depth of sowing, 11 time of sowing, 11 sowing practices, 11-12 Spongospora subterranea, 183, 187, 188 spontaneous centric fusion, 128 Streptomyces scabies, 187, 189, 200 sulphur (S) changes in S metabolism during pathogenesis, 228 - 30disease control, 221–36 elemental sulphur, 223, 226 fungitoxicity of S metabolites, 226 metabolism and plant disease, 224-5 relationship between S nutritional status and S metabolite content, 225 sulphur-induced resistance (SIR), 224-31 sulphur nutritional status of agricultural crops, 230-31 sulphur-induced resistance (SIR), 224-31 potency and spectrum against pathogens, 231 suppressive soils, 18-19 systemic acquired resistance (SAR), 32, 62, 64, 78, 131, 229, 246, 253

tillage, 9-11 tolerance, 126, 142-61 canopy size and structure, 149-50 compensatory adjustments in growth, 152-3 compensatory adjustments in photosynthesis, 150-52 costs, 154-5 modelling, 155-6 potential crop traits, 149-54 quantification, 146-9 source-sink relations and storage reserves. 153 - 4strategy for improving, 156-7 trade-offs with induced resistance between pathogens with different lifestyles, 80 with resistance to insects, 80-82 with mutualistic symbioses, 82 transgenic resistance, 129 trap crops, 177 Trichoderma spp., 29, 30, 31, 32, 33, 34, 35, 39, 41,202 Trichoderma harzianum, 31, 39, 43, 113, 114 Trichoderma virens, 30, 205 Trichoderma viride, 39, 114 vertical resistance, 124 Verticilliun dahliae, 16, 178, 188, 223

yield formation, 144-6