

## Index

- Agrobacterium tumefaciens*, 34–35  
*A. radiobacter*, 34  
 alfalfa, 46, 47, 60, 70–71, 81  
*Allium cepa*, 44  
 anthracnose, 36, 37, 38, 63–64  
 antibacterial compounds  
   bacteriocins, 34–35  
   phytoalexins, 72–74  
 antifungal compounds  
   from bacteria, 10  
   phytoalexins, 43–74  
   pre-formed inhibitors, 12, 44, 54  
   released from precursors, 45, 55  
   self-inhibitors, 30, 33–34, 35  
 antigens, common to host and parasite, 81–83  
*Antirrhinum*, 14, 34  
*Aphanomyces euteiches*, 9, 71  
 apple, 18, 71  
 appressoria  
   formation of, 8, 12–13, 17, 21  
   occluding stomata, 33  
   penetration from, 14–15  
   responses beneath, 39, 63, 70  
*Ascochyta*, 60  
*Asparagus*, 8  
*Avena sativa*, 5; *see also* oat  
 avirulence versus virulence, 1–6  
 avocado, 9
- bacteria  
   cross-protection against, 32, 34–35, 37  
   hypersensitivity towards, 23, 35, 40–41  
   in intercellular spaces, 20  
   as necrotrophs, 3, 21  
   and phytoalexins, 72–74  
   sharing antigens with host, 81–82  
 banana, 9  
 barley, 14  
 bean  
   cross-protection of, 34, 36–37, 38–39, 83–84  
   hypersensitivity in, 27–28, 80  
   infection of, 3, 12, 13, 16–17, 20  
   phytoalexins in, 43–44, 46, 50, 52, 56–57, 59–60, 63–67, 71, 72–73  
 beetroot, 10; *see also* *Beta vulgaris*  
 benzoic acid, 71  
 benzoxazolinones, 55  
 betaine, 11  
*Beta vulgaris*, 10, 53  
 biological control, 34, 42  
 biotrophic versus necrotrophic parasitism, 3  
*Botrytis* spp., 11, 49, 57, 68  
*B. cinerea*, 10–11, 16, 58, 68–70  
*B. fabae*, 3, 48, 69–70  
*Bremia lactucae*, 28  
*Brevibacterium linens*, 73  
 broad bean, 3, 11, 48–49, 51, 68–70, 84
- Canavalia ensiformis*, 46, 47  
 capsenone, 71  
*Capsicum frutescens*, 24; *see also* pepper  
 capsidiol, 51, 52, 71, 74  
 carrot, 44; *see also* *Daucus carota*  
*Carthamus tinctorius*, 53, 54  
 catechol, 44  
 cell death, *see* hypersensitivity and necrosis  
 cell walls  
   penetration of, 16–17  
   polysaccharides in, 16  
 chalcone–flavone isomerase, 59  
 chemotherapy, 42, 45, 55, 59, 61  
 cherry, 35  
 choline, 11  
*Chrysanthemum*, 10  
*Cicer arietinum*, 47  
*Citrus* sp., 9  
*Cladosporium fulvum*, 80  
*Colletotrichum circinans*, 44  
*C. gloeosporioides*, 15, 17  
*C. lagenarium*, 37, 54  
*C. lindemuthianum*  
   cross-protection by, 36, 37, 83–84

Cambridge University Press

978-0-521-11285-7 - Defence Mechanisms of Plants

B. J. Deverall

Index

[More information](#)

- C. lindemuthianum* (cont.)  
hypersensitivity to, 28, 80, 84  
infection by, 3, 12, 13, 16, 20  
phytoalexins in relation to, 57, 59, 63–66, 67, 72
- C. phomoides*, 70  
compatibility versus incompatibility, 3  
*Corynebacterium insidiosum*, 81  
cotton, 54, 81; *see also* *Gossypium barbadense*  
coumestrol, 73  
cowpea, 28, 50; *see also* *Vigna sinensis*  
cross-protection, 6, 30–42  
by direct interference, 33–36  
localised, 32–33  
specific factors involved in, 83–84  
systemic, 32, 36–37, 40–41  
through induced resistance, 35–42  
cucumber, 37, 38, 39; *see also* *Cucumis sativus*  
*Cucumis sativus*, 37, 54  
*Cucurbita pepo*, 54  
cuticle  
antifungal compounds in, 12–15  
penetration of, 14–16, 18–19  
physical effects of, 11–15  
cyanogenic glucoside, 8  
cytological changes, 18–29; *see also* hypersensitivity and necrosis
- daidzein, 73  
*Daucus carota*, 44, 53  
dehydroipomeamarone, 60  
dehydrosafynol, 53  
dihydroxymethoxybenzoxazolinone, 45, 55  
2'-5-dimethoxy-6,7-methylenedioxy-flavanone, 53  
*Diplocarpon rosae*, 16, 18  
DNA, 37, 56, 75  
downy mildews, 14, 28, 36
- Erwinia* sp., 3  
*E. amylovora*, 37  
*E. carotovora*, 73–74  
*Erysiphe* sp., 19, 22  
*E. graminis* f.sp. *tritici*, 17, 21–22  
*E. polygoni*, 39; *see also* powdery mildews  
*Escherichia coli*, 40  
ethylene, 8  
*Euonymus japonicus*, 15
- field resistance, 14, 17, 26, 29; *see also* polygenic resistance  
flax, 4, 8, 34, 81–82
- Fragaria ananassa*, 11  
*Fusarium* spp., 32  
*F. graminearum*, 11  
*F. oxysporum*, 20, 32, 71  
*F. o. f.sp. cubense*, 9  
*F. o. f.sp. pisi*, 9  
*F. solani* f.sp. *phaseoli*, 66, 71, 72
- gene expression  
after penetration, 17, 21–24, 26, 29  
for infection type, 4–6  
mediation of, 56, 64, 75–88  
temperature sensitivity of, 24, 26–27, 85–86
- gene-for-gene hypothesis, 4–6, 22, 75, 81
- glutamic acid, 9  
glutinosone, 51–52  
glyceollin, 49, 73  
*Glycine max*, 46, 47; *see also* soybean  
*Gossypium barbadense*, 53, 54; *see also* cotton
- Haemonchus contortus*, 81  
haustoria, 19, 22–29, 85–86  
compatibility of, with protoplasts, 19  
fates of, in resistant cells, 17, 28–29  
sheath around, 19, 28
- Helianthus annuus*, 34  
*Helminthosporium* spp., 77–78  
*H. sacchari*, 78–79  
*H. turcicum*, 70  
*H. victoriae*, 5, 77–79  
hemigossypol, 53  
hircinol, 53, 54  
hop, 12–13  
*Hordeum vulgare*, 14  
*Humulus lupulus*, 12; *see also* hop  
*p*-hydroxybenzoic acid, 71  
2'-hydroxy-5-methoxy-6,7-methylene-dioxyisoflavone, 53  
hydroxyphaseollin, 46, 72  
hydroxyphaseollone, 71, 72  
hypersensitivity, 17, 22–29, 76, 80, 85  
cross-protection related to, 35, 39–41, 84  
phytoalexins associated with, 43, 45, 55, 56, 63–64, 67–68, 72–74
- infection type, 1–6  
ipomeamarone, 44, 53, 60  
*Ipomoea batatas*, 44, 53; *see also* sweet potato  
kievitone, 46, 47, 50, 66

Cambridge University Press

978-0-521-11285-7 - Defence Mechanisms of Plants

B. J. Deverall

Index

[More information](#)

- Lactuca sativa*, 28  
 leaf surface ecology, 10–13  
*Leptosphaerulina briosiana*, 72  
 lesions, limitation of, 65–66, 68–69, 71  
 lettuce, 28  
 linamarin, 8  
*Linum usitatissimum*, 4, 8; *see also* flax  
*Loroglossum hircinum*, 31, 53, 54  
*Lotus corniculatus*, 46, 47  
 lubimin, 51, 68  
*Lycopersicon esculentum*, 9; *see also* tomato
- maackiain, 46, 47, 72  
 maize, 45, 81–82  
*Malus sylvestris*, 18; *see also* apple  
*Medicago sativa*, 46, 47; *see also* alfalfa  
 medicarpin, 46–49, 60, 70–71, 72  
*Melampsora lini*, 33, 81–82; *see also* flax rust  
 methoxymellein, 44, 53  
 methyl-3,4-dimethoxycinnamate, 34  
 3-methyl-6-methoxy-8-hydroxy-3,4-dihydroisocoumarin, 53; *see also* methoxymellein  
 monilicolin A, 56, 84  
*Monilinia fructicola*, 25, 43, 56  
*Musa* sp., 9  
 mutants, use of, 64, 69, 74, 78
- necrosis, 2, 3, 21  
 after infection, 16–17, 20, 22–29  
 phytoalexin formation associated with, 37–38, 43, 51–52, 55–58, 62–70, 74, 84  
 prevention of, 40  
 recognition in relation to, 76–78, 85–86  
 in sensitized cells, 39, 57  
*Nectria galligena*, 71  
 nematodes, 8  
*Nicotiana* spp., 57  
*N. clelandii*, 51  
*N. glutinosa*, 51  
*N. tabacum*, 9, 51; *see also* tobacco
- oak, 30  
 oat, 5, 33, 77–79, 82  
*Olpidium* spp., 9  
*O. brassicae*, 20  
 onion, 44  
 orchid, 31–32, 44, 53, 54  
 orchinol, 44, 53, 54  
*Orchis militaris*, 44, 53, 54
- Pastinaca sativa*, 53
- pea, 9, 43–44, 46, 57, 71, 72; *see also* *Pisum* spp.  
 pear, 37  
*Pellicularia filamentosa*, 8  
 penetration of plant surfaces, 12–17  
 pepper, 24, 51, 71, 74  
*Periconia circinata*, 77, 78  
*Peronospora tabacina*, 36  
 peroxidase, 57, 59  
*Persea americana*, 9  
 phaseollidin, 46, 47  
 phaseollin, 44–47, 49  
 formation of, 56, 57, 59  
 metabolism of, 71, 72  
 in resistance, 63–66, 72–73, 84  
 phaseolliniso flavan, 46, 47, 50, 65, 66, 72  
*Phaseolus leucanthus*, 47  
*P. lunatus*, 47  
*P. radiatus*, 47  
*P. vulgaris*, 3, 47; *see also* bean  
 phenylalanine-ammonia lyase, 59  
 phytoalexins, 37–38, 43–74, 76, 84  
 biosynthesis of, 58–60  
 in hypersensitive responses, 63–64, 67–68, 72–74  
 induced formation of, 55–58, 67, 68, 86–87  
 lesion limitation by, 65–66, 68–69  
 metabolism of, 68–72  
 sites of formation of, 57–58  
*Phytophthora* spp., 9–10  
*P. capsici*, 25  
*P. cinnamomi*, 9, 10  
*P. citrophthora*, 9, 10  
*P. infestans*, 17, 51, 67–68, 86  
 cross-protection by, 32, 35–36  
 hypersensitivity towards, 25, 27, 80  
*P. megasperma* var. *sojae*, 66–67, 87  
*P. parasitica*, 9, 10  
 phytuberin, 51, 52, 68, 73  
 pisatin, 44–47, 49  
 formation of, 55–56, 57, 59, 71, 72  
*Pisum abyssinicum*, 47  
*P. arvense*, 47  
*P. elatius*, 47  
*P. fulvum*, 47  
*P. sativum*, 9, 47; *see also* pea  
*Plasmodiophora brassicae*, 20  
 pollen, 11, 13, 70  
 polygenic resistance, 5; *see also* field resistance  
 poplar, 15, 17  
*Populus tremuloides*, 15  
 potato, 3, 17, 27, 80  
 blight, 35, 38, 43, 68

Cambridge University Press

978-0-521-11285-7 - Defence Mechanisms of Plants

B. J. Deverall

Index

[More information](#)

- potato (*cont.*)  
 cross-protection of, 32, 35–36, 38  
 phytoalexins in, 43, 51–52, 60, 67–68, 73, 86  
 powdery mildews, 14–15, 19, 21–22, 29, 30, 39  
 pre-formed inhibitors, 44  
 proteins  
 as common antigens, 81–83  
 mediation of specificity by, 75  
 prevention of hypersensitivity by, 41  
 toxin-receptor, 78–79  
 protocatechuic acid, 44, 71  
 protoplasts  
 fungi compatible with, 3, 18–20, 64–65, 67  
 membranes of, 28, 76, 78–79  
 use of isolated, 77, 78, 83  
*Prunus avium*, 35  
*Pseudomonas* spp., 20, 32, 35  
*P. glycinea*, 73  
*P. lachrymans*, 40  
*P. morsprunorum*, 35  
*P. phaseolicola*, 72–73  
*P. solanacearum*, 35, 40  
*P. syringae*, 40  
*Pseudoperonospora humuli*, 12, 13  
*Puccinia coronata* f.sp. *avenae*, 33, 77  
*P. graminis* f.sp. *tritici*, 14, 15, 23–24, 25–27, 54  
*P. helianthi*, 34  
*P. recondita*, 33; *see also* rust fungi  
*Pyrus communis*, 37  
*Pythium aphanidermatum*, 9  
  
*Quercus* spp., 30  
  
 receptor sites for toxins, 78–80  
 recognition between host and parasite, 1, 6, 75–88  
 red clover, 39, 46; *see also* *Trifolium pratense*  
 resistance versus susceptibility, 1–6  
*Rhizoctonia repens*, 31  
*R. solani*, 66  
 ribosomes, 25, 82  
 rishitin, 51, 52, 60, 67–68, 73–74  
 RNA as a recognition factor, 39, 85–86  
 root exudates affecting parasites, 7–10  
*Rosa* spp., 18  
 rust fungi, 12, 14, 19, 22, 29  
 cross-protection against, 32, 33–34, 36, 39  
 crown, 77  
 flax, 4, 33, 36, 81, 82  
 infection types of, 1–3  
 leaf, 86  
 stem, 25–27, 54, 85–86, 87; *see also* *Puccinia* and *Uromyces* spp.  
 rye, 11, 45  
  
*Saccharum officinale*, 78–79  
 safflower, 54; *see also* *Carthamus tinctorius*  
 safynol, 53, 54  
 sativan, 46, 47, 50  
*Secale cereale*, 11; *see also* rye  
 soft-rots, 3, 21, 73  
 sojagol, 73  
*Solanum tuberosum*, 3; *see also* potato  
 soybean, 46, 66–67, 73, 87; *see also* *Glycine max*  
*Stemphylium botryosum*, 70–71, 72  
*S. loti*, 70  
 stomata, 12–15, 19, 33, 70  
 strawberry, 11  
 sugar cane, 78–79  
 sunflower, 34  
 sweet potato, 44, 60; *see also* *Ipomoea batatas*  
  
*Tagetes* sp., 8  
 temperature  
 affecting sensitized cells, 39, 57  
 sensitivity of gene expression to, 24, 26–27, 85–86  
 susceptibility of bean at low, 65–66  
*Thielaviopsis basicola*, 36  
 tobacco, 9, 36–37, 39, 40–41, 51–52  
 mosaic virus, 36, 39, 40, 51  
 necrosis virus, 51; *see also* *Nicotiana* spp.  
 tomato, 9, 34–35, 51, 52, 80  
 toxins, host-specific, 76–80  
*Trifolium pratense*, 39, 47; *see also* red clover  
*T. repens*, 47  
*Triticum aestivum*, 2, 55; *see also* wheat  
  
*Uromyces appendiculatus*, 57  
 syn. *U. phaseoli*, 27  
*U. phaseoli* f.sp. *vignae*, 28  
*Ustilago maydis*, 81–82  
  
*Venturia* spp., 16  
*V. inaequalis*, 18  
 vergosin, 53  
*Verticillium* spp., 20  
 vestitol, 46, 47, 50, 71  
*Vicia faba*, 3, 47, 48, 57; *see also* broad bean  
*Vigna sinensis*, 28, 47; *see also* cowpea

Cambridge University Press

978-0-521-11285-7 - Defence Mechanisms of Plants

B. J. Deverall

Index

[More information](#)

## viruses

bean yellow mosaic, 39

causing phytoalexin formation,  
51–52, 55

resistance induced by, 26, 30, 36, 39

tobacco mosaic, 36, 39, 40, 51

tobacco necrosis, 51

## wheat

antifungal compound in, 45, 54–55

cross-protection of, 33, 39

hypersensitivity of, 23, 25–27

infection of, 2, 11, 14, 17, 19, 21–22,  
23–24

recognition process in, 85–86

wyerone, 47, 48, 50, 51, 58, 69

wyerone acid, 47, 48–50, 51, 58, 69–70

*Xanthomonas* spp., 20*X. axonopodis*, 40*X. malvacearum*, 81

xanthotoxin, 53

*Zea mays*, 45; *see also* maize

zoospores

attracted to roots, 9–10

attracted to stomata, 12–13