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Book review

Induced Plant Defences Against Pathogens and Herbivores

Edited by A. A. Agrawal, S. Tuzun and E. Bent, American Phytopathological Society Press, St. Paul, Minnesota, 1999, $55, 403 pp., ISBN 0-89054-242-2

Induced resistance in plants against pathogenic micro-organisms has a history that spans the twentieth century. Experimental support for the phytoalexin hypothesis proposed by Muller and Borger in 1940 came to a climax in the 1960s when many different plants were found to respond positively to fungal infection by the synthesis of antifungal agents. In my laboratory alone, over 500 legume species were shown to form isoflavonoid-based structures. By contrast, the ability of plants to respond by becoming unpalatable to insect herbivory was only established in the last 25 years. Key experiments carried out by Baldwin on *Nicotiana sylvestris* established significant increases in nicotine biosynthesis following insect feeding. Altogether, there is now a considerable body of experimental results for over 100 plant species in their ability to hinder insect feeding and for nearly a 1000 plant species for phytoalexin and allied responses to pathogen attack. The present volume provides an extensive overview of the mechanism in plants for responses to environmental stresses, comparing and contrasting the changes that occur in the two different systems. Interactions between pathways of resistance are considered and the practical applications in agriculture are assessed.

The first five chapters deal with biochemistry and the mechanisms of resistance. The effect of herbivore saliva on plant defence is reviewed. The involvement of salicylic acid, jasmonic acid and other signal molecules is considered. There are chapters on plant defence responses to pathogens, on herbivore-inducible defensive proteins and on induced plant volatiles. The next five chapters are devoted to ecology and evolution. There is a chapter on the evolution of induction and on adapted phenotypic plasticity in induced plant defence. The final five chapters cover agriculture and applications and include a review of field experiments with the tomato plant involving pathogens, herbivores and parasitoids. There is also an interesting chapter on the commercial development of a thiadiazole derivative which when applied to crop plants is capable of stimulating induced plant resistance.

This is a splendid team effort provided by 44 authors, many active research workers in chemical ecology. This is a fascinating book to read and it succeeds admirably in showing how well organised higher plants are in repelling the invasion of microbes or insect pests, and their ability to survive come what may.

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