

Book review

Induced Resistance to Disease in Plants. Edited by R. Hammerschmidt and J. Kuć. 1995. (Developments in Plant Pathology, Vol. 4). Kluwer Acad. Publ., Dordrecht, the Netherlands.

It has been over sixty years since the phenomenon of induced resistance was recognized as an inducible response of plants to a primary infection that conferred enhanced protection against a subsequent or “challenge” inoculation. The phenomenon was extensively documented by Ross in the early sixties, mainly in tobacco cultivars that react hypersensitively to tobacco mosaic virus, in order to gain insight into the nature of plant resistance to viruses. The subject attracted little attention outside the circle of plant virologists, until in the eighties Kuć realized the potential of induced resistance for plant protection against disease. He initiated a vigorous research program to explore the physiology and biochemistry of induced resistance responses. As a result, plant pathologists now are generally aware that plants can be triggered by either pathogens, avirulent forms of pathogens, cultivar-non-pathogenic races, non-pathogenic bacteria and microbial compounds, or selected chemicals to express an enhanced resistance response against pathogenic fungi, bacteria and viruses, both locally and often systemically, for prolonged periods. This timely volume reviews the current state of the art from various angles. On the one hand, the available literature on induced resistance in the four plant families that have received most attention, is summarized while, on the other hand, the nature and significance of the phenomenon as contributing to plant resistance under natural conditions receives ample attention.

Inevitably in a multi-author volume, there is some repetition and overlap in various chapters, but there are also gaps. Emphasis is placed on induced resis-

tance against fungi and, to a lesser extent, bacteria, whereas viruses receive scant attention. Many of the concepts relating to induced resistance were worked out for the tobacco-TMV system, but this is not adequately reviewed. Fortunately, there are some excellent reviews on this topic available elsewhere. The molecular regulation of systemic induced resistance is well summarized and this topic illustrates that as yet we effectively understand very little of the significance of the molecular changes that have been described for induced plants. The same view emerges from reading the other chapters, from which it is clear that production of phytoalexins, accumulation of pathogenesis-related proteins and reinforcement of cell walls are all likely to contribute to the expression of resistance, but none can be held primarily responsible. This leads one to conclude that induced resistance is a state of preparedness of the plant to quickly and coordinately express an integrated set of responses that effectively impede pathogen penetration, multiplication, spread and survival upon challenge inoculation. Although salicylic acid has been shown to be needed for the expression of induced resistance in at least a few host-pathogen systems, the signal that moves systemically in the plant and induces the resistant state, is still elusive, as are the events that determine the outcome of the initial interaction between an inducer and the plant. Much remains to be explored and the book offers essential background reading as well as suggestions which aspects are most relevant for future research.

The chapters that review the physiology and biochemistry of induced resistance draw together a lot of dispersed data from the literature and provide a good source of information on the knowledge gained well up into 1993. Further investigations may be guided by the thoughtful considerations of types of resistance

and characteristics of induced resistance described by Heath and by the concluding overview by Kuć, in which he draws together several observations into a coherent picture and makes a strong plea for the application of induced systemic resistance to practical plant

protection under agricultural conditions as an effective, inexpensive, natural, consumer- and environmentally-friendly technology.

L.C. van Loon