

**DEVELOPEMENT OF RESISTANCE IN PLANT PATHOGENS
TO SYSTEMIC FUNGICIDES**

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Intensive research is in progress all over the world to exploit the potential of systemic fungicides for the control of plant diseases. The use of systemic fungicides is likely to assume a place of significance in the new strategy of plant disease control because of series of advantages offered by this group of chemicals over the conventional fungicides, in their capacity to get absorbed and translocated into the plant system. In India, extensive research has been conducted on the evaluation of systemic fungicides and antibiotics against plant diseases and the work has recently been reviewed in depth (Dharam Vir, 1976 ; Raychaudhuri and Dharam Vir, 1975). Dharam Vir and Raychaudhuri (1973) reported efficacy of three systemic fungicides viz., Benlate, Bavistin and Methyl thiophanate for the control of powdery mildew of roses (*Sphaerotheca pannosa*). Some studies on the development of resistance in this pathogen to Benlate (benomyl) are reported.

A plot of rose plants were subjected to benomyl treatment and sprayings were initiated in 1973. The plants were treated thrice in a year by spraying the fungicide (1000 ppm) at monthly intervals beginning from first week of January. During all these years viz., 1973, 1974 and 1975, the plants treated with benomyl remained free from the disease while unsprayed plants exhibited heavy incidence of powdery mildew. However during March 1976, severe attack of powdery mildew was observed in plants which have all along been treated with benomyl. The disease made its appearance inspite of the spraying schedule carried out in the months of January, February and March 1976.

It is apparent from these observations that *S. pannosa* incitant of powdery mildew of rose developed resistance to benomyl because of its continuous use for some years which resulted in failure of this systemic fungicide to control the disease.

In recent years, development of resistance in plant pathogen to benomyl and some non-systemic fungicides have been reported from various parts of the world. Dharam Vir *et al*, (1970) reported development of resistance in *Drechslera avenae*

causing blight of oats, to mercurial fungicides in some parts of Denmark. Miller and Fletcher (1974) reported from U.K. isolates of *Botrytis cinerea* which are resistant to benomyl. Recently Wataru (1975) from Japan has reported that *Sphaerotheca fuliginea* the incitant of powdery mildew of cucumber, has developed resistance to benomyl. Georgopoulos (1977) has critically discussed the phenomenon of development of resistance in plant pathogens to continuous use of systemic fungicides. According to Dharam Vir (1977 a, b) it is advisable to continue the use of conventional fungicides and antibiotics along with systemic fungicides so that chances of development of resistance in plant pathogens are reduced to the minimum.

Treatment of rose plants with benomyl for a few years resulted in the development of resistance in *S. pannosa* to this systemic fungicide and consequent failure of benomyl to control the disease.

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