

HISTOCHEMICAL LOCALIZATION IN THE ROOTS OF *IMPATIENS BALSAMINA* L. INDUCED BY THE ROOT KNOT NEMATODE, *MELOIDOGYNE INCOGNITA* (KOFOID & WHITE) CHITWOOD

BY

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As a result of infection with root-knot nematode, *Meloidogyne incognita* alkaline oxidase, peroxidase and phytosterol increased and saponin decreased. Activity of catalase and lignin was observed only in infected roots.

INTRODUCTION

Histochemical changes form a part of physio-chemical changes brought about as a result of infection with pathogens in the host and the information of such changes due to nematode infection is scanty (Bird & Rogers, 1965 ; Endo & Veech, 1969 ; Acedo & Rohde; 1971 ; Giebel *et al.* 1978, 79, 80, 81) it has been observed that considerable histochemical changes occur in the roots of *Celosia cristata*, *Coccinia Cordifolia*, *Lycopersicon lycopersicum* and *Solanum melongena* as a result of infection with the rootknot nematode, *Meloidogvne incognita* (Kofoid & White) chitwood. But the reports with certain enzymes are contradictory, hence, an attempt has been made to study the histochemical lozalization of alkaline oxidase, peroxidase, catalase, phytosterol, saponin and lignin in the roots of *Impatiens balsamina* L., induced by the root-knot nematode.

MATERIALS AND METHODS

Seedlings of *I. balsamina* raised in steam sterilized soil, were transplanted to 12 cm clay pots containing sterilized soil-compost (3 : 1) mixture and later inoculated with 5000 freshly hatched larvae of root-knot nematode, *M. incognita*. Uninoculated pots served as control. After sixty days of inoculation the roots were collected and washed thoroughly. Hand sections of both inoculated and uninoculated plant roots were cut and the presence of alkaline oxidase was tested by using the mixture containing 1 ml of saturated NH_4Cl solution, 1 ml of 5% EDTA, 1 ml of saturated benzidine solution and 1 drop of 3% H_2O_2 , catalase by using hydrogen peroxide and 1% gelatin solution, phytosterol by using chloroform and sulphuric acid ; saponin by using conc. H_2SO_4 or saturated solution of barium hydroxide and lignin by using O.

1g/10ml phloroglucine of 95% alcohol plus 25% hydrochloric acid (Johanson, 1940, Pearse, 1960).

RESULTS AND DISCUSSION

Alkaline oxidase, peroxidase and phytosterol tests showed positive reactions both in inoculated and uninoculated plant roots but the colour reactions indicated higher concentrations of these compound in inoculated roots as compared to uninoculated ones. As a result of nematode infection positive reactions for catalase and lignin were observed whereas, negative for saponin but the last one was detected in healthy roots. It is likely that the nematode secretions might have detoxified the saponins making plants susceptible. Detoxification of saponin is necessary as these have been reported to impart resistance in plants (Wood, 1967).

TABLE 1. *Histochemical localization in the roots of Impatiens balsamina induced by the root-knot nematode, Meloidogyne incognita*

Test chemicals	Reactions in		Reactions
	uninoculated (control)	Inoculated	
Alkaline oxidase	+	++	Brown colour
Peroxidase	++	+++	Gray colour
Catalase	—	+	Evaluation of oxygen gas
Phytosterol	+	++	Initially rose-red and finally turning to brown.
Saponin	+	—	First yellow colour changes to red within 30 minutes and finally becoming blue-green.
Lignin	—	++	Violet colour

— = absent (not detectable) ; + = present in low conc ;

++ = present in moderate conc. ; +++ = present in high conc.

The higher concentration of peroxidase in nematode infested tissues has also been reported by several workers (Endo & Veech, 1969 ; Gagnon, 1967). The increase in peroxidase activity can be accounted for increased concentra-

tions of phenolics. as a result of infection which act as cofactors of peroxidases (Van Fleet, 1959 ; Gagnon, 1967).

Increased activity of enzymes in infected tissues is obvious as nematode secretions might be triggering the cellular activity in infected tissues. Similar increase in catalase activity has been observed in wheat plants infected by *Puccinia graminis* var. *tritici* (Le Tourneau, 1956). With respect to certain enzymes are at variance with those observed earlier (Haseeb *et al.*, 1978, 79, 80). This difference in response, might be due to interaction between the host and the pathogens.

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