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## CHANGES IN IAA OXIDASE ACTIVITY IN RESISTANT AND SUSCEPTIBLE CULTIVARS OF COWPEA IN RESPONSE TO INOCULATION WITH *MELOIDOGYNE INCOGNITA*

by

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**Summary.** Following inoculation with *Meloidogyne incognita* IAA oxidase activity increased in the root-knot nematode resistant cv. C152 and declined in the susceptible cv. S488.

Development and reproduction of plant-parasitic nematodes is fully dependent upon the establishment of proper host-parasite relationship which is very specific especially for endoparasitic nematodes like *Meloidogyne* species. Gall formation in the roots is considered as morphological manifestation of susceptibility and is associated with various biochemical changes (Giebel, 1974). Auxins stimulate nematode development and their level in plants depends on the activity of the enzyme IAA oxidase; its activity has been correlated with resistance to nematodes in many crops (Giebel, 1970, 1974; Knypl *et al.*, 1975; Ganguly and Dasgupta, 1979, 1980). Nematode resistance in cowpea has been related to certain biochemical parameters (Ganguly and Dasgupta, 1988; Mohanty *et al.*, 1986) but, so far, IAA oxidase has not been investigated. The present study was undertaken to ascertain the changes in IAA oxidase activity in resistant and susceptible cultivars of cowpea [*Vigna Unguiculata* (L.) Walp.] when inoculated with *Meloidogyne incognita* (Kofoid *et* White) Chitw.

### Materials and methods

Seedlings of cowpea cultivars S488 and C152, reported to be susceptible and resistant, respectively, to the root-knot nematode *M. incognita* (Darekar and Patil, 1981) were grown in pots filled with sterilized soil. A group of four week old plants from each cultivar was inoculated with active second stage juveniles (500/plant) of *M. incognita*. Another group of plants of each cultivar was left un-

inoculated to serve as control. Plants were uprooted 5, 10 and 15 days after inoculation and the enzyme activity in roots was determined. Two g of freshly collected root material were homogenized in phosphate buffer (0.05M) pH 6.5 and centrifuged at 12,000 rpm for 20 minutes. The supernatant solution was used as enzyme extract. The activity of the enzyme IAA oxidase was determined by the method described by Malik and Singh (1980) by measuring the amount of residual IAA in the mixture using Salkowski reagent. The enzyme activity was expressed in  $\mu\text{g}$  IAA destroyed/mg protein/hr. The concentration of protein in the crude extracts was determined by the method of Lowry *et al.* (1951). The amount of protein in the sample was calculated from the standard curve using bovine serum albumin as a source of authentic protein.

### Results and discussion

The changes in IAA oxidase activity in resistant and susceptible cultivars of cowpea 5, 10 and 15 days after inoculation with *M. incognita* are given in Table I. Enzyme activity of IAA oxidase from uninoculated and inoculated plants of both the cultivars showed significant differences. In resistant cv. C152, the enzyme activity increased following inoculation with the nematode. However, the percentage increase in activity over the control was maximum (84%) at 5 days post inoculation followed by 15 days (49%) and 10 days (19%) (Table I). In resistant uninoculated plants the enzyme activity increased rapidly from the

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TABLE I - Changes in IAA oxidase activity in resistant and susceptible cultivars of cowpea upon inoculation with *Meloidogyne incognita*.

Days after inoculation	µg IAA destroyed/mg protein/hr					
	Resistant (C152)			Susceptible (S488)		
	Uninoculated	Inoculated	% change over control	Uninoculated	Inoculated	% change over control
5	53.10	97.64	+84	70.20	58.50	-16
10	83.71	99.30	+19	79.36	71.16	-10
15	54.60	81.31	+49	49.99	44.88	-10

5th (53.10) to the 10th day (83.71) postinoculation, whereas such sequential change in activity was negligible in resistant inoculated plants. In the susceptible cv. S488, the enzyme activity declined after inoculation with *M. incognita*. Percentage reduction in activity was relatively high (16%) at 5 days post inoculation but decreased (10%) at 10 and 15 days post inoculation.

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