INT. J. BIOL. BIOTECH., 5 (3-4): 231-234, 2008.

HISTOPATHOLOGY OF POMEGRANATE ROOTS INFECTED WITH *MELOIDOGYNE JAVANICA*

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ABSTRACT

Histopathological studies revealed that *Meloidogyne javanica* larvae entered roots by puncturing action of the stylet. The cells adjacent to nematode were severely damaged causing cell congestion. A number of cells had egg masses and sections of larvae. The medullary cells were unequal in size. Giant cells were present with broken cell walls. The pathological symptoms observed in the present findings, especially disruption of cortical tissue ultimately affected plant growth by reducing absorption of water and nutrients.

Keywords: Pomegranate, roots, histopathology, Balochistan.

INTRODUCTION

Pomegranate (*Punica granatum*) is an important fruit of Balochistan. It is grown on 10726 thousand hectares with a production of 31661 tonnes (Anon., 2006). In studies conducted earlier a number of nematodes have been found to be associated with Pomegranate in Balochistan including root-knot nematode (Khan *et al*., 2005). Histopathological studies have been carried out to study the damage caused by root-knot nematode (*Meloidogyne javanica*) (Treub) Chitw., to Pomegranate roots.

MATERIALS AND METHODS

Naturally infested roots of Pomegranate (*Punica granatum*) were collected from Wadh, district Khuzdar, Balochistan from a depth of 5-30 cm. The roots were washed thoroughly in running water for 1 h. fixed in F.A.A. and processed for histological technique according to Sass (1964). Dehydration was carried in serial concentrations of known volume of ethanol. Dehydrated root tissue were then infiltrated and embedded in paraffin wax at 52°C for 10 days. During the wax infiltration, air bubbles were removed from root tissue under vacuum. Using a rotary microtome 10 to 12 µm thick sections were cut and stained with haemotoxylin and eosin. Photomicrographs were taken using an automatic photographic camera mounted on a research microscope Nikon Optiphot-2 in the Department of Zoology, University of Karachi.

RESULTS AND DISCUSSION

Meloidogyne javanica larvae entered into the roots by puncturing action of the stylet. The cells adjacent to the nematode were severely damaged causing congestion of the tissue (Fig. 1). Numerous cells had egg masses and sections of larvae were seen (Fig. 2). Cortical layer was severely damaged with separation of the cells. The underlying tissue was compressed and cellular structures showed atrophy. The medullary cells appeared unequal in size, some were fused to form large streaks (Fig. 3). A number of giant cells were observed with broken cell walls (Fig. 4).

Earlier Patel *et al*. (1988) recorded extensive damage to phloem and cortical parenchyma causing destruction of feeder roots. Glazer *et al*. (1983) reported interrelationship between ethylene production, gall formation and root-knot nematode development in tomato plant infected with *Meloidogyne javanica*. Glazer *et al*. (1984) studied ethylene production involvement in gall formation induced by root-knot nematodes. Glazer *et al*. (1985) reported ethylene production by *Meloidogyne* spp. infected plants.

Lopez *et al*. (1984) reported histopathological changes due to *M. incognita* on *Nacobbus aberrans.*

Masood and Hussain (1976) described biochemical changes in the root-knot infected tomato and eggplant. The pathological conditions observed in the present findings, i.e. disruption of cortical tissue ultimately affected plant growth by reducing absorption of water and nutrients from soil.

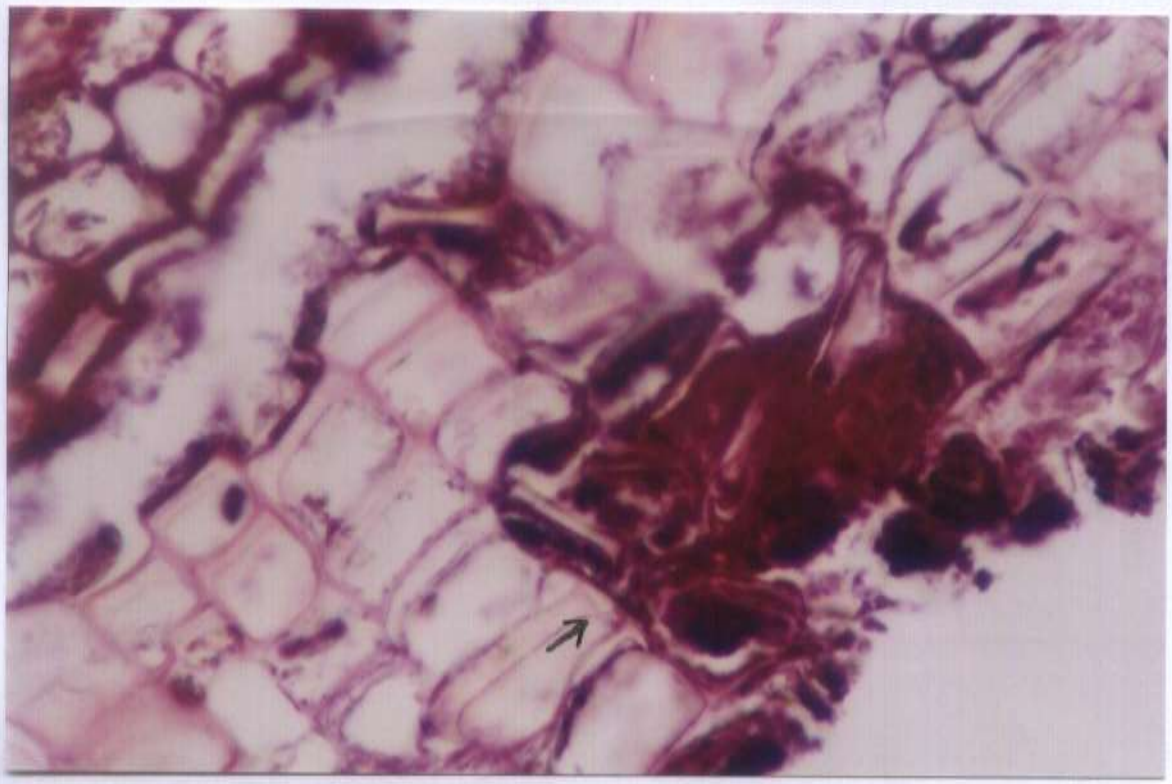

Fig. 1. Photomicrograph showing section of females and congestion of tissue at the penetration site (x 200).

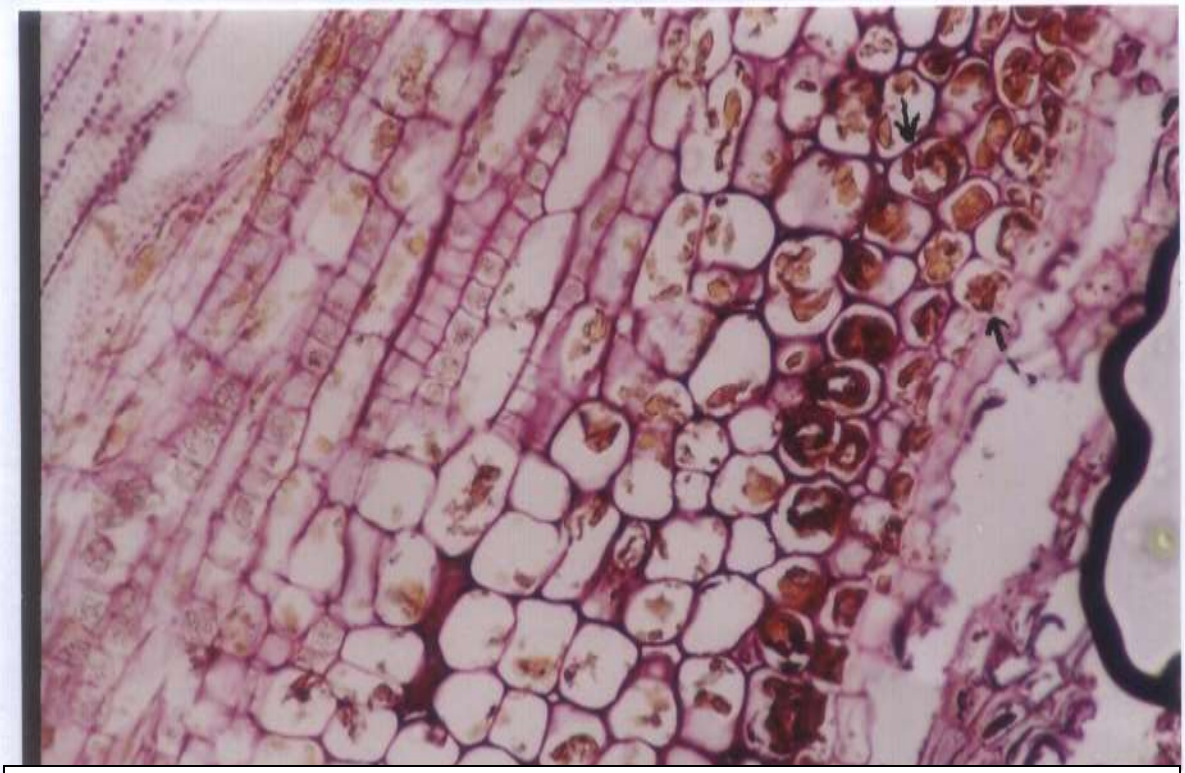

Fig. 2. Photomicrograph showing numerous cell having egg masses and section of larvae present (x 100).

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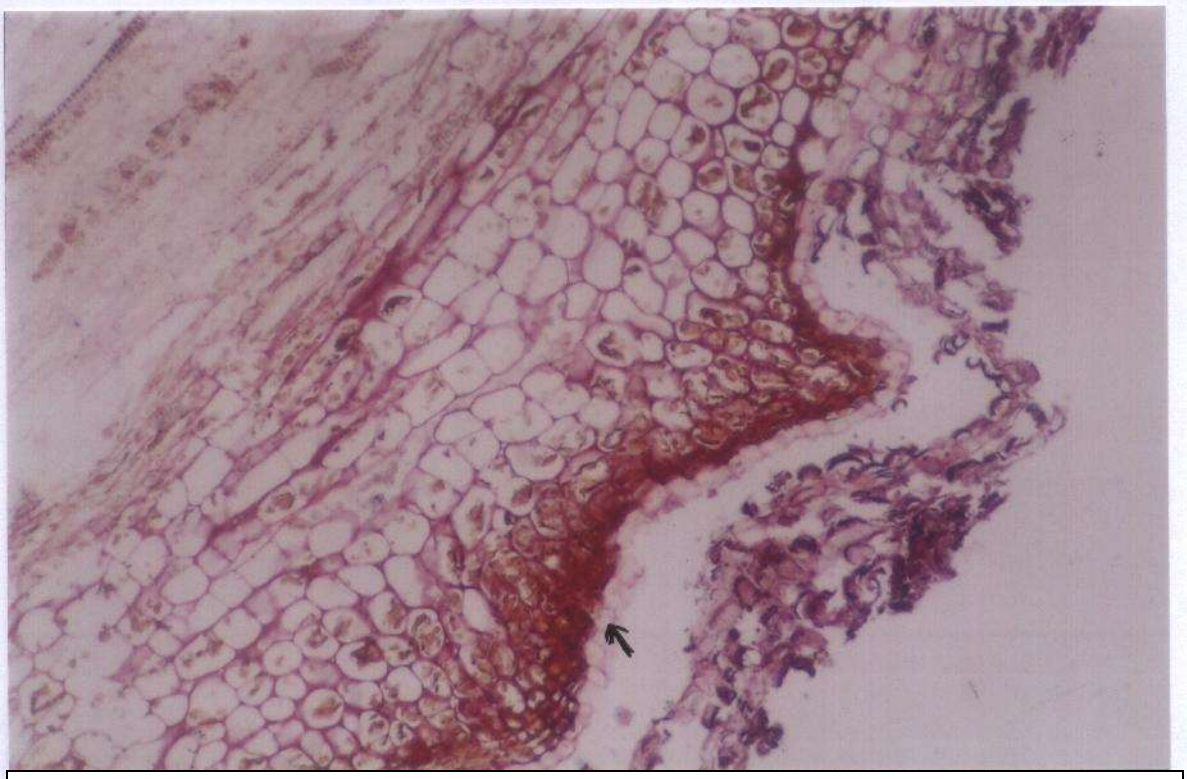

Fig. 3. Photomicrograph showing cortical layer severely damaged with separation of cells. Cellular structures show atrophy, medullary cells appear unequal in size (x 50).

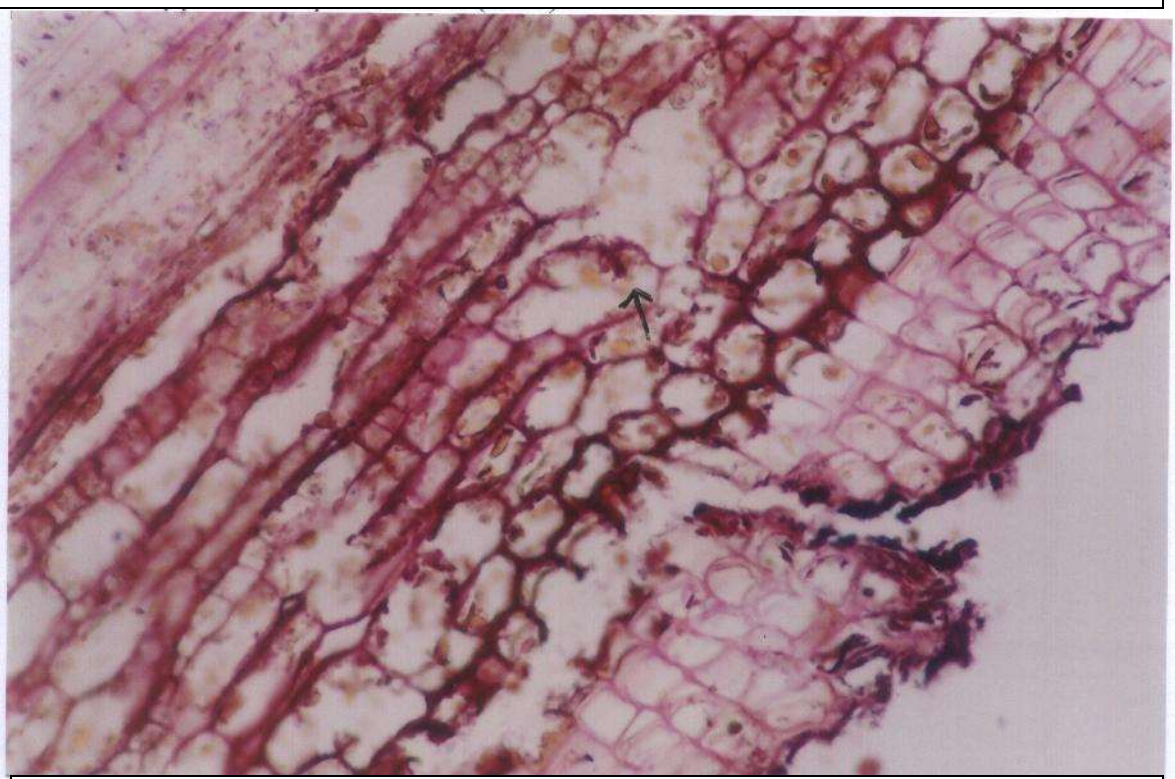

Fig. 4. Photomicrograph showing Giant cells with broken walls (x 100).

This study suggests that nematodes cause considerable damage to Pomegranate trees in Balochistan and therefore the management of nematode populations is essential to obtain sustained yield.

ACKNOWLEDGEMENT

Financial support to the senior author from the Pakistan Science Foundation is gratefully acknowledged.

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(*Accepted for publication September 2008*)