

Short communication

Cold aqueous extracts of African marigold, *Tagetes erecta* for control tomato root knot nematode, *Meloidogyne incognita*

N. Natarajan^a, A. Cork^{b,*}, N. Boomathi^a, R. Pandi^a, S. Velavan^a, G. Dhakshnamoorthy^a

^aTamil Nadu Agricultural University, Coimbatore, India

^bNatural Resources Institute, University of Greenwich, Central Avenue, Chatham Maritime, Kent ME4 4TB, UK

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Abstract

Cold aqueous extracts (20% w/v, 100 ml aliquots) of pre- and post-flowering whole plants, root and stem portions of *Tagetes erecta* were tested for their ability to control *M. incognita* in infested soil (10 kg) in pots planted with susceptible *Lycopersicon esculentum*. Plant height and leaf number were significantly greater in *T. erecta* treated *L. esculentum* than plants grown in untreated infested soils. Whole *T. erecta* plant extracts were more efficacious than stem extracts although both were more effective than root extracts and extracts from 40-day old plants were more efficacious than those from 70-day old plants. Root gall indices of *L. esculentum* treated with *T. erecta* plant extracts were significantly lower than untreated checks and comparable with carbofuran-treated plants. Similarly, fruit yield from plants treated with *T. erecta* extracts was significantly better than untreated checks and comparable with carbofuran-treated plants. The value of applying *T. erecta* extracts as an alternative to intercropping for farmers is discussed.

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1. Introduction

Tomato, *Lycopersicon esculentum* Mill. is a major vegetable crop grown throughout temperate and tropical regions of the world in an area of 3.59 million ha and with a total production of 99 million tonnes per annum (Anonymous, 2000). Among the many pests and diseases that affect tomato production (Muthukrishnan et al., 2003) plant parasitic nematodes, such as the root knot nematode, *Meloidogyne incognita*, cause particularly severe yield losses, typically up to 50 percent (Darekar and Mhase, 1988) as a result of root deformation which diminishes function and predisposes plants to other pathogens.

Meloidogyne spp. are notoriously difficult to control because of their wide host range and high rates of reproduction, with generation times of typically between 20 and 30 days in tropical soils and females capable of producing a thousand eggs. Many synthetic nematicides are expensive and highly toxic (Ijani and Mmbaga, 1988;

Ploeg, 2002; Wang et al., 2002). In recent years, there has been considerable interest in the nematostatic properties of African marigold, *Tagetes erecta* thought to result from oxygen radicals produced by heterocyclic sulphur-containing thiophenes, such as α -terthienyl (Castro and Munoz, 1982; Uhlenbroek and Bijloo, 1958).

Tagetes spp. are typically planted as intercrops or in rotation with crops to control nematodes. Thus, Alexander and Waldenmaier (2002) found that populations of root-lesion nematodes, *Pratylenchus penetrans*, were reduced by 98% when *T. erecta* was grown in rotation with *L. esculentum*. Ploeg (2002) demonstrated that *L. esculentum* fruit yields were consistently higher when grown after *Tagetes* spp. compared to leaving land fallow, and gave yields comparable to those obtained with *L. esculentum* grown in fumigated soils. Similar results were obtained when *T. erecta* was raised as a cover crop and the residues incorporated into the soil before growing taro, *Colocastia esculenta* (Sipes and Arakaki, 1997) or intercropped with soybean, *Glychines max* (El-Hamawi et al., 2004).

Though effective, *Tagetes* spp. cover-crops or intercrops reduce vegetable crop yields because of the need to set aside

*Corresponding author. Fax: +44 1634 880066.

E-mail address: a.cork@gre.ac.uk (A. Cork).