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Effect of Some Medicinal Plants on Egg Hatching of *Meloidogyne javanica*, Root Knot Nematode

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Abstract

This study was conducted to test the effect of *Tagetes patula* and *Commicarppus boissieri* on egg hatching of *Meloidogyne javanica*. Crude extract of these plants demonstrated toxic effect inhibit larval hatch to a varying degree and comparison of the results showed that *C. boissieri* possess a high nematicidal activity as compared to *T. patula*. On the other hand the flowers of *T. patula* have more nematicidal components as compared to the leaves and roots. *C. boissieri* and crude extract of flower of *T. patula* at 1mg/ml resulted in 32.81 and 32.53 percent permanent inhibition in egg hatching respectively.

Introduction

Nematicides are commonly used for the control of plant parasitic nematodes. Since nematicides produce environmental pollution and health hazards in man and animals (Singh and Sakuja, 1994), efforts have been made to use other safer methods for nematode control (Saleem *et al*., 1997). Application of organic matter in soil for improvement of crop productivity is an old practice. Beneficial effect of organic matter in the phytonematodes demonstrated by the Linford (1937). Mustard, sunflower and marigold are known to be antagonistic to many plant-parasitic nematodes. It is postulated that if the plant residues of these crops are incorporated into the soil after harvest, there would be additional stress on nematodes. In the present study, the effect of Tagetes patula and Commicarpus boissieri on egg hatching by *M. javanica* (Treub.) Chitwood were tested.

Materials and Methods

Experiment was carried out in Soilborne Disease Research Laboratory, Department of Botany, University of Karachi. Air dried leaves of Commicarpus boissieri and flowers), leaves (L) and roots (R) of Tagetes patula were asked in ethanol and disintigrated in a homogenizer. After soaking for 15 days,. ethanolic extract was filtered. The ethanolic extract obtained was dried in a acary vacuum evaporator (Eyla N) under pressure at low temperature (45°C).

Two ml of crude extract (1mg/ml, 0.1mg/ml, 0.01mg/m1 and 0.001 mg/ml were transferred in cavity blocks and allowed to dry. After 48 hours two medium size egg, masses were selected by examination with a stereoscope macroscope and placed in cavity blocks containing different concentrations of plant extract. Cavity blocks containing 2ml evaporated ethanol served as control. Each treatment was replicated four times and cavity blocks were kept ndomized at room temperature (25-28°C) during the entire period of hatching. The counting of juveniles was done daily. After 48 hours, the egg masses were then transferred after thorough washing with sterile distilled water to watch glass containing 2 ml distilled water to see whether the egg masses kept in the culture supernatant had been permanently or temporarily inactivated. The emergence of juveniles was again recorded for 72 hours. Data were analyzed and subjected to factorial ANOVA (FANOVA) according to Gomez and Gomez (1984).

Results

Data present in Table 1 show that the percentage of juveniles hatched reduced with an increase in extract concentration at all the exposure period. Less juveniles emmerged from the egg mass kept in extract concentration compared with untreated control. *T. patula* (R) at 1mg/m1 resulted in 61.95 percent inhibition in egg hatching. At the end of 72 hours hatching period crude extract, egg masses were transferred to distilled water. More juveniles emerged from egg messes transferred from crude extract but the total number were significantly ($p < 0.05$) less than in control at the end of 6 days hatching period (3 days in extract + 3 days in distilled water). Crude extract of *C. ioissieri* and *T. patula* (F) caused 32.81 and 32.53 percent inhibition of juveniles hatched respectively.

Discussion

Results obtained in the present study revealed that crude extract of *C. boissieri* and *T. patula* caused permanent inactivation of eggs of *M. javanica*. There does not appear to be any previous report on the use of *C. boissieri* in the control of plant parasitic nematodes. In this study, crude extract of *C. boissieri* resulted in inhibition of *M. javanica* egg hatching. Presumably *C. boissieri* posses some toxic compounds responsible for the suppression of plant parasitic nematodes. There are reports where an active component was isolated from roots of *Tagetes erecta* which posses significance nematicidal activity against *M. javanica* (Atkinson *et al*., 1965).

Uhlenbroek and Bijloo (1958) observed that, although the juice of *T. patula* was in effective against cysts of potato roots eelworm, an ethanolic extract of the plant had *in vitro*

Table 1: Effects of crude extract of *Tagetes patula* and Commicarpus biossieri on hatching of *Melodidogyne javanica* egg

Treatments	Egg mass in extract Exposure time (hours)			Egg mass in distil water Exposure time (hours)			Total juveniles hatched	Redu % over control
	24	48	72	24	48	72		
Control	77.2	121.5	230.0	24.5	35.5	41.2	271.0	-
T.p. (R)* 1mg/ml	15.7	46.2	87.5	46.0	83.7	116.0	203.5	24.9
0.1 mg/ml	32.5	78.7	133.7	24.2	72.7	91.2	225.2	16.9
0.01 mg/ml	23.2	80.7	170.5	30.7	53.7	67.2	237.7	12.3
0.001mg/ml	34.2	100.2	266.0	19.5	31.7	40.0	266.0	1.9
T.p. (F)* 1 mg/mt	22.5	47.7	151.2	30.0	22.7	31.7	183.0	32.5
0.1 mg/ml	13.2	77.5	195.7	32.0	53.0	60.0	255.7	5.7
0.01 mg/ml	31.2	97.2	170.5	32.2	56.5	62.5	233.0	14.1
0.001mg/ml	33.5	96.2	212.5	33.2	52.7	58.2	270.7	0.1
T.p. (L)* 1mg/ml	46.0	86.2	159.7	20.5	32.2	40.0	199.7	26.3
0.1 mg/ml	45.0	101.2	188.2	20.2	34.7	43.7	231.9	14.4
0.01 mg/ml	60.0	105.7	181.2	29.5	41.0	44.7	226.0	16.6
0.001mg/ml	63.2	107.0	207.5	24.5	29.5	44.7	252.2	7.0
C.b. 1 mg/ml	31.5	63.0	126.0	35.2	51.5	56.2	182.2	32.8
0.1 mg/ml	41.0	73.2	137.0	33.2	45.7	55.2	192.2	29.1
0.01 mg/ml	46.2	100.0	180.5	29.7	35.0	42.7	223.2	17.6
0.001mg/m1	61.7	114.2	213.2	17.5	50.0	34.2	247.5	8.75
LSD <0.05	17.0	29.9	50.1	14.9	18.3	22.3	-	-

*T.p. (R) = Crude extract of roots of *Tagetes patula*
T.p. (F) = Crude extractof flowers of *Tagetes patula*
T.p. (L) = Crude extract of leaves of *Tagetes patula*

activity against nematodes such as Ditylenchus dipsaci and Anguina tritici and larvae of Heterodera rostochiensis and Paratylenchus penetrans. The present study would therefore suggest that *T. patula* and *C. boissieri* could be exploited for the development of nematicides as they seems to posses good source of nematicidal components.

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