

Effect of Some Weed extracts on parasitisation behaviour of *Trichogramma* spp. (Hym: Trichogrammatidae)

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ABSTRACT

Trichogramma chilonis Ishii. cards treated with *Ipomoea palmata* extracts showed highest parasitisation (50.66) and emergence (46.00) followed by those treated with *Cynodon dactylon* extracts. The lowest mean per cent parasitisation (13.33) and mean percent emergence (12.00) were observed in the cards treated with *Gynandropsis pentaphylla* extracts. The mean per cent parasitisation by *T. japonicum* was highest (49.33) on cards treated with *Trianthema portulacastrum* extracts followed by *Echinochloa colonum* extracts (47.33). Whereas it was lowest for *Euphorbia hirta* (15.00) and *Parthenium hysterophorus* extracts (17.00). The mean per cent emergence was high in the cards treated with *E. colonum* (44.00) followed by *T. portulacastrum* extracts (42.00). The mean per cent emergence was lower in the cards treated with *G. pentaphylla* extracts (12.00). *T. poliae* has shown the highest mean per cent parasitisation (44.33) and emergence 43.33 on the cards treated with *I. palmata*. The lowest mean per cent parasitisation (14.00) and emergence (12.00) were on the cards treated with *E. colonum* extracts.

An exhaustive array of chemical substances are produced and released by organisms, which serve in inter-specific communication. These chemical substances are known as semiochemicals. The communication between the trophic levels cannot be understood well without a proper understanding of the direct or indirect, beneficial or detrimental effects of semiochemicals (Whitman, 1988). A wide range of volatile compounds produced by plants, are important in guiding parasitoids and predators to their host or prey habitat (Price, 1986; Turlings *et al* 1980). The present study was undertaken to investigate the interactions between host plants, associated weeds and the egg parasitoids, *Trichogramma* spp.

MATERIALS AND METHODS

The stems and leaves of crop-associated weeds (Table 1) were collected and shade dried for 12 hours. About 20 g of each plant sample was weighed and chopped into small pieces. These were transferred to 250ml conical flasks. A known volume of acetone was poured into the individual conical flask containing chopped plant materials. The mouths of the flasks were covered with non-absorbent cotton and were incubated for 72 hrs. The plant materials were filtered through Whatman number 1 filter paper. The extracts were concentrated by gentle heating at

50° C. Desirable concentrations of the extracts were prepared after dilution with acetone (containing 0.1% teepol).

The larvae of the factitious host *Corcyra cephalonica* (Stainton) were reared on broken maize grains mixed with yeast 2% at 28± 2°C and 65 ± 5% relative humidity. Sterilized eggs of the host were used for maintenance of *Trichogramma chilonis*, *Trichogramma japonicum* and *Trichogramma poliae* cultures in a BOD incubator at 25 ± 2 °C and 70 ± 5 % relative humidity. Clean, healthy (0-24 hour old) eggs of *Corcyra cephalonica* sterilized under UV light (15 minutes) were washed twice in hexane to remove any traces of scales and kairomones present on the surface of the eggs. They were then pasted equidistantly on 2 x5 cm white cards at the rate of 100 per card. Each card was sprayed with 0.5 ml of plant extracts using a glass atomizer. The sprayed cards were allowed to dry in shade for half an hour and were introduced into glass vials of 15 x 2.5 cm. *Trichogramma* adults were anesthetized using etherized carbon dioxide for 15 seconds as described by Paul, 1973. Healthy fast reviving females were transferred to each vial at the rate of 20 females per card. The females were allowed to parasitize the host eggs for 24 hours and then the egg cards (referred as Trichocards) were shifted to fresh glass

Table 1. The details of the plants used in the study.

Name of the plant extract	Family	Conc. Of the extract (gm/ml)
<i>Echinochloa colanum</i> L.	Graminae	0.03
<i>Parthenium hysteroporus</i> L.	Compositae	0.03
<i>Cyperus rotundus</i> L.	Cyperaceae	0.03
<i>Trianthema portulacastrum</i> L.	Aizoaceae	0.02
<i>Gynandropsis pentaphylla</i> D.C	Capparidaceae	0.004
<i>Euphorbia hirta</i> L.	Euphorbiaceae	0.01
<i>Achyranthus aspera</i> L.	Amaranthaceae	0.02
<i>Lantana camara</i> L.	Verbanaceae	0.03
<i>Amaranthus spinosus</i> L.	Amaranthaceae	0.02
<i>Ipomea palmata</i> L.	Covolvulaceae	0.04
<i>Tridax procumbens</i> L.	Compositae	0.02
<i>Cynodon dactylon</i> (L) pers	Graminae	0.02

vials. Percent parasitisation was recorded on 6th day while the adult emergence on the 12th day. The whole set up was maintained at 25± 2 ° C and 70±5% relative humidity. Each treatment was replicated three times.

RESULTS AND DISCUSSION

In the case of *T. chilonis* and *T. poliae* the mean per cent parasitisation was 50.66 and 44.33, and emergence 46.00 and 43.33 respectively when treated with extract of *I. palmata*. *T. japonicum* showed highest parasitisation (49.33) and emergence (44.00) with the extract of *T. portulacastrum* and *E. colanum* respectively. In case of *T. chilonis* and *T. poliae* lowest parasitisation and emergence was recorded in *G. pentaphylla* (13.33 and 12.00 respectively) and *E. colanum* (14.00 and 12.00 respectively). *T. procumbens* extract also showed lowest parasitisation (16.33 %) in case of *T. poliae*. *T. japonicum* indicated lowest parasitisation (15.00 %) and emergence (13.00 %) in extracts of *E. hirta* and *G. pentaphylla*, respectively (Table 2).

Khan and Tiwari (2001) observed that the mean per cent parasitisation by *T. chilonis* was 48.00 and 10.66 when the cards were treated with the extracts of *P. hysterophorus* and *L. camara*. The effects of these weed extracts were significantly different from all other extracts under study. The weed extracts showing higher rate of parasitisation and emergence could be utilized for enhancing the activity of the naturally occurring as well as released natural

enemies. But the results need to be confirmed through field studies. The presence of such weeds species in the crop field may be encouraged for increasing the natural enemy population, which in turn would help in maintaining the natural balance.

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Table 2. Effects of various weeds extracts on parasitization and emergence of *Trichogramma* spp.

Name of the plant extract	Conc. of the extract (gm / ml)	Mean percent parasitization			Mean percent emergence		
		<i>T. chilonis</i>	<i>T. japonicum</i>	<i>T. poliae</i>	<i>T. chilonis</i>	<i>T. japonicum</i>	<i>T. poliae</i>
<i>Echinochloa colanum</i> L.	0.03	31.00 (31.00)	47.33 (47.33)	14.00 (14.00)	26.33 (26.33)	44.00 (44.00)	12.00 (12.00)
<i>Parthenium hysteroporus</i> L.	0.03	43.66 (41.36)	17.00 (24.30)	16.00 (14.14)	33.66 (35.45)	13.33 (21.39)	13.66 (21.67)
<i>Cyperus rotundus</i> L.	0.03	32.66 (34.85)	30.33 (33.41)	23.33 (21.12)	24.33 (29.54)	23.00 (28.64)	20.33 (18.77)
<i>Trianthema portulacastrum</i> L.	0.02	24.00 (21.96)	49.33 (44.61)	19.00 (25.83)	21.00 (19.35)	42.00 (20.22)	15.33 (23.05)
<i>Gynandropsis pentaphylla</i> D.	0.004	13.33 (21.39)	17.00 (24.33)	26.33 (31.72)	12.00 (20.25)	12.00 (20.22)	20.66 (27.02)
<i>Euphorbia hirta</i> L.	0.01	16.33 (16.33)	15.00 (15.00)	24.33 (24.33)	13.00 (13.00)	13.00 (13.00)	20.66 (20.66)
<i>Achyranthus aspera</i> L.	0.02	28.00 (31.94)	46.33 (42.89)	21.33 (26.07)	24.66 (29.77)	40.33 (39.42)	14.33 (22.25)
<i>Lantana camara</i> L.	0.03	41.66 (40.20)	19.00 (25.83)	21.33 (26.65)	31.66 (27.73)	18.00 (25.09)	17.00 (24.33)
<i>Amaranthus spinosus</i> L.	0.02	42.66 (40.78)	44.66 (41.93)	28.66 (24.59)	40.00 (39.23)	40.66 (39.62)	23.33 (11.39)
<i>Ipomea palmata</i> L.	0.04	50.66 (45.38)	26.00 (23.53)	44.33 (46.72)	46.00 (42.70)	22.33 (20.51)	43.33 (41.16)
<i>Tridax procumbens</i> L.	0.02	31.00 (33.83)	26.66 (31.07)	16.33 (23.53)	25.33 (30.21)	22.33 (28.18)	12.00 (20.53)
<i>Cynodon dactylon</i> (L) pers	0.02	48.00 (43.85)	34.33 (35.86)	19.66 (26.66)	44.00 (41.55)	33.33 (35.28)	15.33 (23.03)
S.Em±		0.76 (0.51)	0.94 (0.63)	0.73 (0.57)	0.74 (0.51)	0.91 (0.71)	0.82 (0.71)
CD at 1%		3.04 (2.03)	3.74 (2.53)	2.89 (2.25)	2.94 (2.02)	3.61 (2.82)	3.50 (2.84)
CV		4.17 (2.62)	5.42 (3.37)	6.27 (3.7)	4.96 (2.95)	6.67 (4.34)	9.29 (5.29)

* Values in parentheses are angular transformed values

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