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INFLUENCE OF DIFFERENT HOSTS ON THE ADULTS OF *Trichogramma chilonis*

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ABSTRACT

The influence of different hosts on the biology of adults of *Trichogramma chilonis* (Ishii) was tested in the laboratory. *T. chilonis* showed highest preference for the eggs of *Pthorimoea operculella* as shown by highest parasitisation (76.2%), adult emergence (96.33%) females (55.31%) and longevity (6.4 days)

KEY WORDS : Hosts, Influence, *Trichogramma*, Biology

The Trichogrammatids are exclusively egg parasitoids, primarily of Lepidoptera. The biology and vigour of *Trichogramma* is highly influenced by the host of the parasitoid (Navarajan Paul *et al.*, 1981). Hence, the present study was undertaken to find out the influence of different hosts on *T. chilonis*.

MATERIALS AND METHODS

Adults of *T. chilonis* were bred on *Corcyra cephalonica* (Stainton) which were mass multiplied on *cyruhu* grains in jars (11x 37.5 cm) following the method of Navarajan Paul (1973). The host *Pthorimoea operculella* (Zeller) was mass multiplied based on the method developed by Platner and Oatman (1968) and *Helicoverpa armigera* (hubner) was bred on a semi-synthetic diet (Rabindra and Dhandapani, 1988). *Spodoptera litura* (Boisduval) was bred on castor leaves Ignoffo (1965).

The eggs of *C. cephalonica*, *P. operculella*, *H. armigera* and *S. litura* were uniformly mounted separately on a card (6 x 2 cm) at the rate of 100 eggs with gum. The eggs of *P. operculella* and *H. armigera* laid on cloths (by mass culture) were separated using 0.05 per cent sodium hypochlorite. The eggs of *S. litura* were separated from the egg masses using a brush and then pasted on the cards. Five cards of each host eggs were prepared and got parasitised on exposure in two pairs of *T. chilonis* in a test tube for 24 h. The parasitised eggs were separated and placed in small glass vials for adult emergence. The parasitoids were provided with 50 per cent honey solution as food on a small piece of cloth inside the test tube. The open ends of the test tubes and vials were plugged with surgical cotton. The adults in the vials on emergence were maintained until they died to observe adult longevity. The experiment was conducted at 27±1°C and 70 ± 5 per cent relative humidity. Observations on parasitic efficiency, emergence, longevity and development period were recorded.

Table 1. Biology of *Trichogramma chilonis* on different hosts.

Hosts	Parasitisation (%)	Emergence (%)	Males (%)	Females (%)	Sex ratio Male : Female	Adult longevity (days)	Development period (days)	Egg size	
								Length μ	Width μ
<i>Corcyra cephalonica</i>	76.4 (60.92)a	97.40 (80.98)a	45.43	54.57	1:1.19b	6.15b	9.2a	521.8	362.0
<i>Helicoverpa armigera</i>	33.4 (35.29)c	47.00 (43.26)c	71.79	28.21	1:0.40c	1.60b	8.4b	714.5	636.4
<i>Spodoptera litura</i>	42.8 (40.84)b	52.84 (46.61)b	77.88	22.12	1:0.28c	5.00c	8.2b	698.8	582.0
<i>Pthorimoea operculella</i>	78.4 (62.3)a	97.70 (81.31)a	41.78	58.22	1:1.39a	6.40a	9.0a	624.2	420.1

(Means of five replications) Figures in parentheses are Arc sin percentages. In a column, means followed by the same letter are not significantly different as 5% level by DMRT.

RESULTS AND DISCUSSION

Adults of *T. chilonis* vigorously parasitised on *P. operculella* (78.4%) (Table 1) which confirm to the findings of Kfir (1981). The eggs of *Corcyra* were parasitised to an extent of 76.4 per cent. *Corcyra* is the highly preferred host for the most of the *Trichogramma* species (Navarajan Paul et al., 1981). Emergence of adults was also high and was on a par from eggs of *P. operculella* (97.70%) and *C. cephalonica* (97.40%). Lower rate of parasitisation and emergence was recorded from eggs of *Helicoverpa* and *S. litura*. A wide variation in the sex ratio of *T. chilonis* was observed due to influence of different hosts: 1:1.40 from *P. operculella*, 1:1.19 from *C. cephalonica*, 1:0.40 from *H. armigera* and 1:0.29 on *S. litura*

Longevity of females emerged from eggs of *P. operculella* was higher than from eggs of *C. cephalonica* and *H. armigera* which were on a par. Females from eggs of *S. litura* lived short. Development was rapid on eggs of *S. litura* and *Helicoverpa* while it took 9.0 days on eggs of *P. operculella*, and 9.2 days on *Corcyra* eggs. This confirms the findings of Flanders (1935) that solitary specimens of *Trichogramma* have a longer development period than gregarious specimens.

The number of eggs deposited by *Trichogramma* in a single host egg depends on the size of the host egg (Klomp and Teerink, 1962) This may explain the lower number of parasitised eggs of *Helicoverpa* (size 714.5 μ l x 636.4 μ w) by of *Trichogramma* compared to tuber moth eggs (624.2 μ l x 420.1 μ w). The percentage emergence of *Trichogramma* from *Helicoverpa* eggs was very

low, whereas the percentage emergence from *Corcyra* or tuber moth eggs was very high. This may be due to the collapse of the eggs of *Helicoverpa* in which parasitoids die as larvae, pupae or even older pupae with full coloration (Stinner et al., 1974). So the shorter development time observed for *Helicoverpa* eggs is of no practical importance as only a few adults emerged from those eggs compared to tuber moth eggs. Though more number of *Corcyra* eggs were parasitised, a higher emergence ratio and female percentage were obtained from tuber moth eggs. According to Flanders (1945) tuber moth eggs contain more nutrients than *Corcyra* eggs and *Trichogramma* reared on tuber moth eggs are larger and more robust.

Comparing the economics of host culturing, the cost of production of one cc of *Corcyra* eggs works out to Rs.13/- where as the cost of mass breeding the same quantity of *Pthorimoea* eggs is Rs. 10/- since the tuber moth proliferates on discarded potatoes that can be obtained from go downs and markets. The results indicate that tuber moth eggs are the better hosts than *Corcyra* for rearing of *Trichogramma*.

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FEASIBILITY OF ESTABLISHING ALFALFA MEAL PROCESSING PLANTS IN TAMIL NADU

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ABSTRACT

A study was conducted to analyse the economic feasibility of establishing an alfalfa meal processing unit in Coimbatore District. The benefit-cost ratio of an alfalfa meal unit producing and marketing 300 t per year was 1.06. The net present value and internal rate of return were Rs.2,63,502.96 and 44.80 per cent respectively. Alfalfa meal plant would break-even at 257.55 t per annum.

KEY WORDS : Alfalfa Meal Plant, Feasibility, Tamil Nadu

Alfalfa is the most productive, perennial legume fodder, renowned for its nutritive value. It possesses a deep tap root system, which imparts drought tolerance. It has a very high productivity in terms of drymatter. A well managed alfalfa crop has the highest sale value of all forage species. It produces more protein per ha than any other crop. Alfalfa, therefore can be known as the "Queen of the Forages". Alfalfa green meal is rich in protein and is normally used in cattle feed mix and poultry feed mix. All green fodder crops being highly perishables, create several problems in marketing and involves higher labour cost in marketing. Besides, the farmers face many problems in marketing of their produce viz., lack of market information, processing units, market infrastructure and price fluctuation.

Keeping in view of the aforesaid facts, a study was undertaken in Udumalpet area where the alfalfa green fodder was successfully grown. To avoid the exploitation of the farmers by the traders and to build a competitive environment for the

crop, an attempt was made to prepare a feasibility report for starting a alfalfa meal processing unit. The objectives of the study are :

- (i) to study the economics of alfalfa processing and identify the potentials for starting new processing unit, and,
- (ii) to suggest suitable policy measures to encourage commercial alfalfa meal processing and marketing.

MATERIALS AND METHODS

In order to fulfill the objective, Tamil Nadu Agro-Industries Corporation Limited (TAI) started an alfalfa meal plant in 1977. Considering the production potentials, an attempt was made to prepare a feasibility report for starting new alfalfa meal processing units in the area studied, so as to help entrepreneurs to venture into this business, the existing only processing unit was constituted as a case for knowing the economic, technical, financial and managerial feasibilities of alfalfa meal processing unit.