THE ROLE OF HYMENOPTEROUS PARASITOIDS ATTACKING CITRUS LEAFMINER *PHYLLOCNISTIS CITRELLA* STAINTON IN PUMMELO ORCHARDS IN PICHIT PROVINCE, THAILAND

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Abstract

A survey on hymenopterous parasitoids of citrus leafminer (CLM), *Phyllocnistis citrella* Stainton (Lepidoptera: Phyllocnistidae) as well as a study on population dynamics of CLM larvae, pupae and their mortality caused by hynenopterous parasitoids were carried out in the pummelo growing area in Pichit province, Thailand during 1990. Nine species of hymenopterous parasitoids were found namely, *Citrostichus phyllocnistoides* (Narayanan), *Tetrastichus* sp., *Cirrospilus quadristriatus* Subba Roa & Ramamani, *Sympiesis striatipes* (Ashmead), *Closterocerus trifasciatus* Westwood, *Ageniaspis citricola* Logvinovskaya, *Kratoysma* sp., *Teleopterous* sp., *Eurytoma* sp. The estimated percentage parasitism of CLM larvae during May to September ranged from 25.42 to 91.93. The population dynamics of CLM larvae and pupae as well as percentage parasitism in chemical insecticide treated and untreated pummelo orchards were compared and discussed.

1. Introduction

Citrus leafminer (CLM), *Phyllocnistis citrella* Stainton has been reported as a serious pest of citrus in Asia and Australia because it retarded the growth of nursery and newly planted citrus trees and also reduced the yield of the trees [1, 2, 3]. Weerawut [4] suggested the CLM is a destructive pest of citriculture in Thailand because its hosts are the economic important crops such as pummelo (*Citrus grandis* Osbeck), mandarin orange (*C. reticu lata* Blanco), sweet orange (*C. sinensis* Osbeck) and acid lime (*C. aurantifolia* Swingle). This paper presents some informations on the population dynamics of CLM and the role of hymenoperous parasitoids in pummelo orchards in Pichit province which is one of the important pummelo growing areas in Thailand.

2. Materials and Methods

The investigations were carried out in three pummelo orchards namely Site 1, Site 2 and Site 3 in Pichit province. Site 1 was not treated with chemical insecticide but Site 2 and Site 3 were under conventional insect pest control. Each site was planted with 200 to 300 of 7 to 10 year-old pummelo trees. Fifteen trees at each site were randomly checked by picking five tender leaves from each of four geographical directions (North, South, East and West) of each tree at forthnighly intervals during May to September in 1990. The number of larvae, pupae and parasitized larvae on the sampling

leaves were recorded. The meteorogical data for the period have been averaged and shown in Fig. 4. In addition a large number of infested leaves were collected and brought back to the laboratory in Bangkok. Of these 50 leaves were checked for the number of healthy and parasitized larvae under stereo microscope. The larvae and pupae of CLM and also pupae of parasitoids were placed individually in small plastic boxes (3 x 3 cm) and kept under room temperature until the emergence of adult parasitoids. The emerged adult parasitoids were preserved in 70% alcohol for subsequent identification.

3. Results and Discussion

Nine species of hymenopterous parasitoids of CLM were found as below:

I. Family Eulophidae

1. *Tetrastichus* sp.
2. phyllocnistoides (Narayanan)
3. *Cirrospilus quadristriatus* (Subba Rao and Ramamani)
4. *Sympiesis striatipes* (Ashmead)
5. *Closterocerus trifasciatus* Westwood
6. *Kratoysma* sp.
7. *Teleopterus* sp.

II. Family Encyrtidae

8. *Ageniaspis citricola* Logvinovskaya

III. Family Eurytomidae

9. *Eurytoma* sp.

Most of the parasitiods are ectoparasites *except A .citricola,C .trifasciatus, Kratoysma* sp. and *Teleopterus* sp. which are the endoparasitoids. The most abundant species were *Tetrastichus* sp., *C. quadristriatus, S. striatipes* and *A. citricola.*

The results of population fluctuation studies are shown in Figs. 1-3. There were three population peaks during the four months of the rainy season while the highest larval population at Site 1 Site 2 and Site 3 was 219, 276 and 171 per 300 leaves in June for which the percentage parasitism was 84.93, 85.94 and 85.38 percent respectively. Thus rainfall and irrigation are believed to be indirect factors which influenced the pummelo flushing leaves due to the high infestation of CLM that was always observed. The percent parasitism of CLM by parasitoids from the data collected for population fluctuation ranged from 8.4 in May to 85.41 in June while the estimated parasitism from the 50 infested leaves ranged from 25.42 in May to 91.93 in August (Table. 1). It may be noted that these parasitoids played an important role as natural biotic factors in population suppression of CLM because high parasitization occurred almost throughout the investigation.

4. Acknowledgement

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5. References

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Table. 1. Percent parasitism of citrus leafminer attacked by some hymenopterous parasitoids in pummelo orchards in Pichit province

Date	No.of CLM larvae per 50 larvae		No.of parasitzed leaves	Percent Parasitism
May	30	59	15	25.42
June	13	158	66	41.77
June	27	320	193	60.31
July	12	60	22	36.66
July	26	81	52	64.19
Aug	8	62	57	91.13
Aug	22	196	159	81.12
Sept	6	220	147	66.18
Sept	20	229	150	65.50
			average	59.14±218

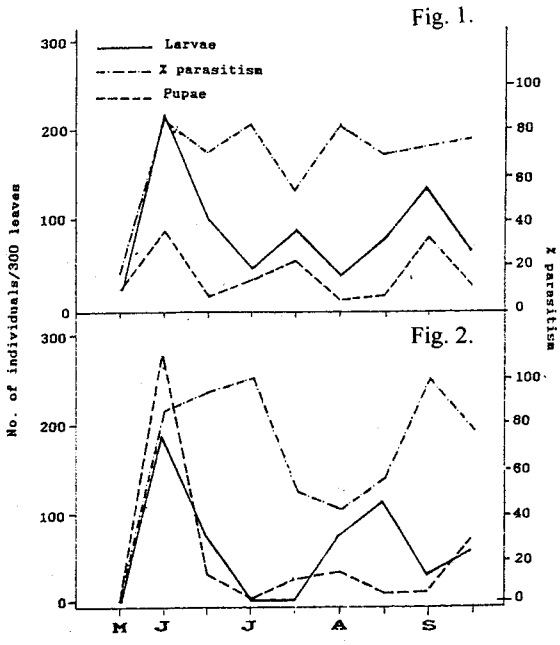

Fig.1. Population fluctuation of citrus leafminer and parasitism of larvae in pummelo orchard (Site 1) in Pichit Province in 1990.

Fig. 2.Population fluctuation of citrus leafminer and percent parasitism of larvae in pummelo orchard (Site 2) in Pichit Province in1990

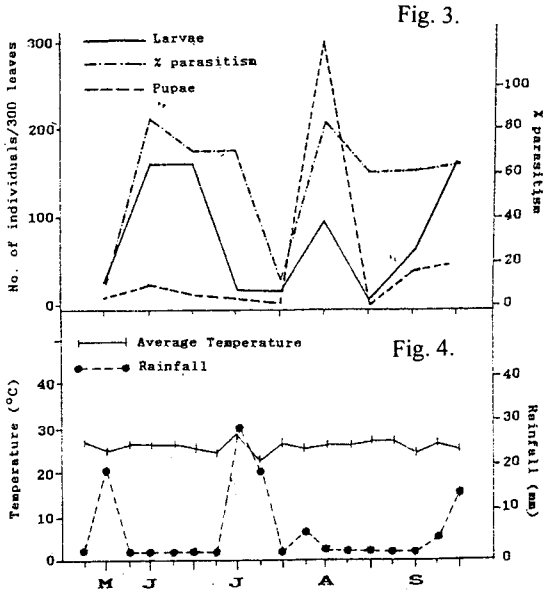

Fig. 3. Population fluctuation of citrus leafminer and percent parasitism of larvae in pummelo orchard (Site 3) in Pichit Province in 1990.

Fig. 4. Meterological data of Pichit Province for 1990.