

*Jpn. J. Ent.*, 64(4): 876–878. December 25, 1996

## Can *Paracentrobia andoi* ISHII (Hymenoptera, Trichogrammatidae) Parasitize the Egg of the Brown Planthopper?

Precha VUNGSILABUTR

Entomology and Zoology Division, Department of Agriculture, Bangkok 10900, Thailand

Tadashi MIURA<sup>1)</sup>

Laboratory of Insect Management, Faculty of Agriculture, Shimane University,  
Matsue 690, Japan

and

Kazuki MIURA

Laboratory of Insect Pest Control, Chugoku National Agricultural Experiment Station,  
Fukuyama 721, Japan

**Abstract** It was investigated whether *Paracentrobia andoi* attacks the brown planthopper *Nilaparvata lugens* eggs or not in the laboratory. The percentage parasitism of *P. andoi* on *Nephotettix cincticeps* eggs was 93.9%, but there was none at all on *N. lugens* eggs. It is concluded that *P. andoi* does not parasitize *N. lugens* eggs in Japan.

**Key words:** *Paracentrobia andoi*; egg parasitoid; *Nilaparvata lugens*.

### Introduction

*Paracentrobia andoi* ISHII (Hymenoptera, Trichogrammatidae) is an important egg parasitoid of the green rice leafhopper (GRL), *Nephotettix cincticeps* UHLER (KIRITANI *et al.*, 1978; MIURA, 1990). This species has also been recorded as an egg parasitoid of *Delphacodes sameshimai* MATSUMURA *et al.* and ISHIHARA and the brown planthopper (BPH), *Nilaparvata lugens* STÅL in Japan (ESAKI *et al.*, 1937; ISHII, 1938; DOUTT, 1961) and Taiwan (MIURA *et al.*, 1981). Later investigations, however, have not revealed its parasitism on BPH in Japan (KUNO, 1968; MIURA, 1990; *etc.*). It is very important to determine whether *P. andoi* attacks BPH eggs or not to set up for the integrated insect pest management system in paddy fields. This stimulated our laboratory investigations described below.

### Materials and Methods

The initial stock of *P. andoi* was obtained by collecting parasitized eggs of

<sup>1)</sup> Present address: Yakumo-dai 2–9–24, Matsue 690, Japan

GRL from paddy fields in Hamada, Shimane Pref., Japan in 1986. The emerging parasitoids were then reared on eggs of GRL deposited on rice seedlings. Stock cultures of the parasitoid were maintained continuously in the laboratory.

Adults of BPH, GRL, small brown planthopper (SBPH), *Laodelphax striatellus* (FALLÉN), and whitebacked rice planthopper (WBPH), *Sogatella furcifera* (HORVÁTH), were originally collected from paddy fields in Matsue, Shimane Pref. and released in rearing cages (24×26×30 cm) by species to obtain their eggs for experiments. Rice seedlings, provided as food, were renewed about once a week. The rearing stocks of leaf- and planthoppers mentioned were maintained at room temperature. Additional collections of adults of these species were made as necessary. To obtain eggs for experiments, adults were placed in the same type of rearing cage containing rice seedlings for 24 hrs. To determine the effect of host egg ages on parasitism of *P. andoi*, deposited BPH eggs were incubated at 25°C and 16L-8D.

One female of this parasitoid having thelytoky in reproduction (VUNGSIL-ABUTR, 1978) was placed in a test tube (16×2 cm) containing GRL, SBPH and WBPH eggs, respectively. Both ends of tube were open, one covered with nylon gauze and the bottom with a sponge inserted. Another experiment was made on BPH eggs which had been deposited within the last 24 hrs, 2, 3, 4 and 5 days before the experiment. Ten of each host eggs deposited in seedlings per tube were exposed to the parasitoid. After 24 hrs for oviposition, eggs were removed from the tube and reared at 25°C and 16L-8D.

The number of adult parasitoids emerged and host nymphs hatched were recorded daily. Host plants were dissected under a binocular stereo-microscope when no more parasitoids emerged. Since *P. andoi* is a solitary parasitoid, the percentage parasitism was estimated as follows:

$$P(\%) = W/(W+H) \times 100$$

where *P* is percentage parasitism, *W* is the number of parasitoids emerged and *H* is the number of host nymphs hatched plus unhatched eggs.

### Results and Discussion

Total number of females of *P. andoi* used for GRL, SBPH and WBPH eggs was 66, 23 and 12, respectively. Another experiment using different ages of BPH eggs was repeated ten times for each age group. Total number of GRL, SBPH, WBPH and BPH eggs tested was 660, 230, 120 and 840, respectively.

The percentage of *P. andoi* parasitism on GRL eggs was 93.9%, but none on BPH, SBPH or WBPH eggs at all. Another experiment on BPH eggs of different ages also resulted in no parasitization.

ESAKI *et al.* (1937), DOUTT (1961) and MIURA *et al.* (1981) reported that

*P. andoi* emerged from GRL and BPH eggs, while many studies on the population dynamics of BPH and GRL as well as *P. andoi* did not find out *P. andoi* parasitism on BPH eggs (KUNO, 1968; KIRITANI *et al.*, 1970; SASABA & KIRITANI, 1972; VUNGSILABUTR, 1978; MIURA, 1990; FOWLER *et al.*, 1991; WATANABE *et al.*, 1992).

It is concluded that *P. andoi* does not parasitize BPH eggs in Japan. Previous authors who reported this parasitism might had been confused with GRL and BPH eggs since the oviposition site of these species in rice plants is similar. The parasitism by *P. andoi* on BPH eggs in Taiwan (MIURA *et al.*, 1981) is suspected to have resulted from confusion between *P. andoi* and *P. yasumatsui* SUBBA RAO, the latter being definitely parasitic on BPH in Taiwan.

### References

- DOUTT, R. L., 1961. The hymenopterous egg parasites of some Japanese leafhoppers. *Acta Hym.*, **1**: 305–314.
- ESAKI, T., S. HASHIMOTO & T. SAMESHIMA, 1937. Report on the leafhoppers injurious to the rice plant and their natural enemies. *Pub. Ent. Lab., Dept. Agric., Kyushu Imp. Univ.*, **8**: 1–43, 3 pls. (In Japanese.)
- FOWLER, S. V., M. F. CLARIDGE & J. C. MORGAN, 1991. Egg mortality of the brown planthopper, *Nilaparvata lugens* (Homoptera: Delphacidae) and green leafhoppers, *Nephotettix* spp. (Homoptera: Cicadellidae), on rice in Sri Lanka. *Bull. Entomol. Res.*, **81**: 161–167.
- ISHII, T., 1938. Description of two new trichogrammatids from Japan. *Kontyû, Tokyo*, **12**: 179–181.
- KIRITANI, K., S. KAWAHARA, T. SASABA & F. NAKASUJI, 1978. Studies on the population dynamics of the green rice leafhopper and spiders and on the epidemiology of rice dwarf virus. *Agric. Forest. Fish. Res. Council. Jpn. Sci. Rep.*, **104**: 1–159. (In Japanese with English summary.)
- KUNO, E., 1968. Studies on the population dynamics of rice leafhoppers in a paddy field. *Bull. Kyushu Agric. Exp. Stn.*, **1**: 19–37.
- MIURA, K., 1990. Life-history parameters of *Paracentrobia andoi* (ISHII) (Hymenoptera, Trichogrammatidae), an egg parasitoid of the green rice leafhopper, *Nephotettix cincticeps* UHLER (Homoptera, Deltocephalidae). *Jpn. J. Ent.*, **58**: 585–591.
- MIURA, T., Y. HIRASHIMA, M. T. CHUJO & Y. I. CHU, 1981. Egg and nymphal parasites of rice leafhopper and planthoppers. A result of field studies in Taiwan in 1979 (Part 1). *Esakia, Fukuoka*, (16): 39–50.
- SASABA, T. & K. KIRITANI, 1972. Evaluation of mortality factors with special reference to parasitism of the green rice leafhopper, *Nephotettix* spp. (Homoptera: Cicadellidae). *Appl. Ent. Zool.*, **21**: 313–321.
- VUNGSILABUTR, P., 1978. Biological and morphological studies of *Paracentrobia andoi* (ISHII) (Hymenoptera: Trichogrammatidae), a parasite of the green rice leafhopper, *Nephotettix cincticeps* UHLER (Homoptera: Deltocephalidae). *Esakia, Fukuoka*, (11): 29–51.
- WATANABE, T., T. WADA & N. M. N. bin NIK SALLEH, 1992. Parasitic activities of egg parasitoids on the rice planthoppers, *Nilaparvata lugens* (STÅL) and *Sogatella furcifera* (HORVÁTH) (Homoptera: Delphacidae), in the Muda area, Peninsular Malaysia. *Appl. Entomol. Zool.*, **27**: 205–211.

(Received January 26, 1996; Accepted September 18, 1996)