

## SPECIES COMPOSITION AND SEASONAL PREVALENCE OF NATURAL ENEMIES OF THE MULBERRY SCALE, *Pseudaulacaspis pentagona* (Targioni), ON TEA TREES IN SHIZUOKA PREFECTURE, JAPAN

Akihito Ozawa

Shizuoka Tea Experiment Station, 1706-11 Kurasawa Kikugawa-cyo, Shizuoka, 439-0002, Japan

### Summary

Species composition and seasonal prevalence of natural enemies of the mulberry scale, *Pseudaulacaspis pentagona* (Targioni), on tea trees in Shizuoka prefecture of Japan were investigated by the methods of yellow sticky traps hung on tea trees, collecting adults of the parasitoids emerged and dissection of female adults of the scales in 2002 and 2003.

Four species of parasitic wasps, *Arrhenophagus chionaspidis*, *Pteroptrix orientalis*, *Thomsonisca typica* and *Anabrolepis lindingaspidis*, and some species of predacious insects, *Pseudoscymnus hareja*, *Chilocorus kuwanae*, *Cybocephalus gibbulus* and Cecidomyiidae (predacious gall midge) in which dominant species was *Dentifibula viburni*, were found. Primary dominant species of the parasitoids and the predacious beetles was *A. chionaspidis* and *P. hareja*, respectively. The peaks of the occurrence of *A. chionaspidis* adults were observed at the same peaks of egg hatching and male emerge of the mulberry scale. *P. hareja* adults observed mainly in summer season, and the predacious gall midge adults was observed mainly after summer.

### Keywords

*Pseudaulacaspis pentagona*, mulberry scale, natural enemy, parasitoid, predator, biological control

### Introduction

The mulberry scale, *Pseudaulacaspis pentagona*, is one of the most important pest on tea trees in Japan, especially it has been occurred severely in Shizuoka prefecture these years. It is suggested that various pesticides applied in tea fields have a effect on natural enemies of the scales as one of reasons of the severe occurrence. Therefore, natural enemies of the scales is considered to be important factor to control the scales population, and it is necessary to clarify the actual condition of natural enemies of the scales in tea fields. Then we investigated species composition and seasonal prevalence of natural enemies of the mulberry scale in tea fields at Shizuoka prefecture of Japan

### Materials and Methods

#### 1. Capture by yellow sticky traps

Yellow sticky traps (10 × 10 cm, both sides) were hung on branches of tea trees in tea fields of Shizuoka tea experiment station from April to November in 2002 and 2003, and the number and species of natural enemies of the mulberry scales captured by these traps were investigated every few days.

#### 2. Emergence of parasitoids

Tea branches with the female scales collected from tea fields on May (overwintering generation), July (the first) and September (the second) were stored in pet bottles attached a cup to collect emerged insects. Two months after the treatment, the species and the number of natural enemies collected in the cups were investigated.

#### 3. Dissection of adult female scales

Adult female scales of each generation collected from tea fields on May, July and September in 2002 and 2003 were dissected under a stereoscopic microscope to distinguish species of natural enemies parasitized the scales. Species of parasitic wasps were distinguished by the shapes of mummies.

## Results and Discussion

### 1. Capture by yellow sticky traps

Four species of parasitic wasps, *Arrhenophagus chionaspidis*, *Pteroptrix orientalis*, *Thomsonisca typica* and *Anabrolepis lindingaspidis*, and some species of predacious insects, *Pseudoscymnus hareja*, *Chilocorus kuwanae*, *Cybocephalus gibbulus* and Cecidomyiidae (predacious gall midge) were captured by traps. The species of the most numbers captured was *A. chionaspidis*. This parasitoid occurred at the same time as hatching and male's emerging of the scale and 5 or 6 peaks on the seasonal prevalence were found (Fig. 1).

### 2. Emergence of parasitoids

The same species of parasitic wasps as examination by sticky traps were confirmed. Primary dominant species of the parasitoids was *A. chionaspidis*, secondary species was *P. orientalis* (Fig. 2). Adults of Cecidomyiidae (predacious gall midge) in which dominant species was *Dentifibula viburni*, were also confirmed. Species composition of natural enemies was changed with generation of the scales.

### 3. Dissection of adult female scales

Four species of parasitic wasps, *A. chionaspidis*, *P. orientalis*, *T. typica* and *A. lindingaspidis* which was few, were confirmed. *A. chionaspidis* was primary dominant also in this method. In investigation of second generation of the scale, more larvae of Cecidomyiidae were observed.

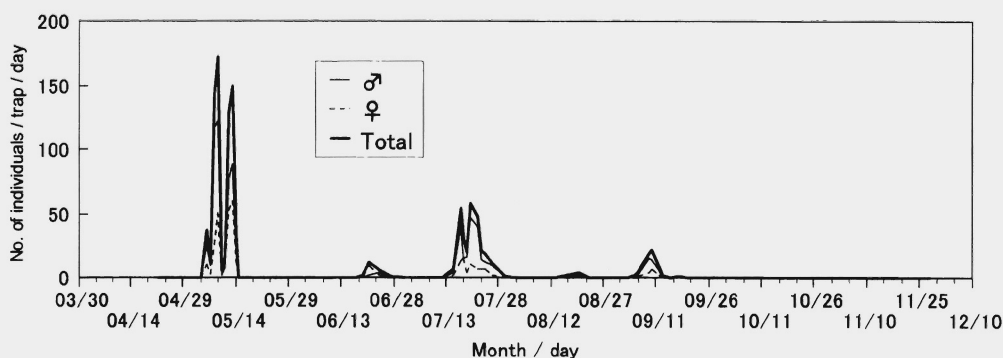


Fig. 1 Seasonal prevalence of the parasitoid, *Arrhenophagus chionaspidis*, by yellow sticky traps in a tea field in 2002.

### Location

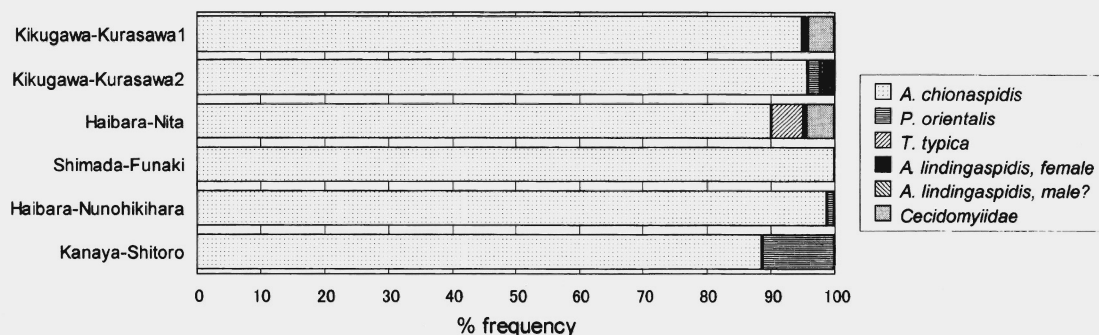


Fig. 2 Species composition of natural enemies of the mulberry scale emerged from overwintering generation collected at some tea fields in Shizuoka prefecture Japan (2002).