Short Communication

Biological notes on *Challia hongkongensis* Ho & Nishikawa (Dermaptera: Pygidicranidae: Challinae)

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Abstract
The biology of *Challia hongkongensis* is described including the systematics, feeding habit and forceps function.

Key words: Dermaptera, *Challia hongkongensis*, Hong Kong, feeding habit

Introduction

The diet of earwigs varies from omnivorous, to purely carnivorous or herbivorous (Chen & Ma, 2004). Some species are regarded as agricultural pests (Zhang, 1996); some on the other hand are beneficial in controlling pests (Zeng et al, 2004). Locally, no observations of earwigs' feeding habits have previously been reported. The author observed a female *Challia hongkongensis* Ho & Nishikawa eat a nymph of the same species – the first report of this species' feeding behaviour.

Taxonomy and habitat of *Challia hongkongensis* Ho & Nishikawa, 2009

The genus *Challia* Burr, 1904 totally contains eight species restricted to the Oriental region. In the past, *Challia* was regarded as a Palaearctic genus (Moon & Kim, 1985). Nevertheless, two additional species were found in Vietnam (Anisyutkin, 1994; Anisyutkin & Gorokhov, 1998a and 1998b) and extended this genus from the Palaearctic further to South-East Asia. *Challia hongkongensis* Ho & Nishikawa, 2009 has recently been described from Hong Kong and is the third species represented in China (Nishikawa, 2006; Ho & Nishikawa, 2009). The allied species is *Challia gigantia* Nishikawa, 2006 but this differs in structure of the forceps and the male genitalia.

Challia hongkongensis is not a widely distributed species and is restricted to montane forest in Hong Kong.

From April to August, adults can be found actively hunting on rocks or leaves. It is a fast-moving insect that hunts at night. When disturbed, individuals move quickly to hide themselves under rocks or leaf litter. The habitat is confined to montane forest above 400 metres above sea level.

Eating habit and forceps function

On 21 August 2009, at Tai Tung Shan, north Lantau Island, around 700m above sea level, at midnight, a hunting female was observed eating a nymph of the same species. The author did not observe the hunting process but only saw the outcome (Figure 1). The adult female held the prey by its dentate forceps and bent the forceps toward its mouthparts to eat the prey (Fig. 2). Although the abdomen of the nymph was eaten, it was still alive and its head and antennae were moving. This probably proves that *Challia hongkongensis* uses its dentate forceps to hunt prey in the wild. In addition, *C. hongkongensis* is also considered to feed herbivorously based on a female observed at Kowloon Peak (Fig. 3), which possibly ate plant seeds or fruits.

From the above observations of this small nocturnal earwig, the species has varied diet including small insects and plant fruits. *C. hongkongensis* is considered to be an omnivorous earwig species.

In most earwigs, the inner margins of the forceps have sharp denticles. Their usage is related to the hunting and feeding habit. The inner denticles of the forceps of female and male *C. hongkongensis* are quite different in dentation and morphological structure (Figs. 4 and 5). In females, the forceps are almost straight and parallel-sided. The apices are curved inward and pointed. Each inner arm has 10 to 15 sharp teeth. The posterior teeth are longer than the anterior (basal) teeth. In males, the basal two thirds of the arms are curved outward while the posterior third of the forceps are almost parallel-sided. The curved part is smooth without any teeth. The posterior part is sparsely armed with four to six teeth. The teeth of the male forceps are as sharp as the female's, but slightly shorter. Generally, the teeth of the female forceps are denser than those of the male.

It is believed that earwigs use their forceps to kill and hunt their prey directly (Zeng et al, 2004). Keeping their "hunting weapon" (forceps) clean is important (Fig. 3). Furthermore, the function of long and sharp teeth can be considered as to hold and keep the prey. Based on the forcep structure of *Challia hongkongensis* and other allied members in the genus, the dentate inner arms provide evidence of their hunting method and eating habit in the wild. Although the teeth of the male forceps are weaker than in the female, they are believed to be strong enough to kill and hold prey, in addition to having an important function as display devices (Briceno and Eberhard, 1995). Therefore, the sexually dimorphic morphology of the forceps in *C. hongkongensis* is significant.

Conclusion

Challia hongkongensis is a localised earwig and is only known from Hong Kong. Its ecology needs further detailed study especially on its unknown parental behaviour and life cycle.

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Figure 1. Female *C. hongkongensis* holding prey by forceps

Figure 2. *C. hongkongensis* nymph as prey of adult female

Figure 3. Female *C. hongkongensis* cleaning its forceps; possible fruit diet

Figure 4. Male forceps

Figure 5. Female forceps