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a potential pest of *Orthosiphon stamineus* Bentham
(Lamiales: Lamiaceae) in Malaysia

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The lace bug *Cochlochila bullita* (Stål) (Heteroptera: Tingidae), a potential pest of *Orthosiphon stamineus* Benthham (Lamiales: Lamiaceae) in Malaysia

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Abstract. *Orthosiphon stamineus* Benthham, a medicinal plant in the family Lamiaceae, is used to make a well known herbal tea in many countries including Malaysia. Since its establishment as an important cash crop, the herb has been relatively free from any serious insect problems until recently. In Selangor, Malaysia we observed the herb heavily infested by the lace bug *Cochlochila bullita* Stål (Heteroptera: Tingidae). This is the first record of its occurrence in Malaysia and also the first record on the host plant, *O. stamineus*. The lace bug damages the host plant by piercing and sucking young leaves and shoots, resulting in the curling and drying of the leaves and shoots. The infestation pattern and survival of *C. bullita* on *O. stamineus* indicates this lace bug has the potential to be a serious pest of this medicinal plant.

Introduction

Orthosiphon stamineus Benthham is a well known medicinal plant from the family Lamiaceae. The herb is found throughout Southeast Asia and tropical Australia. In Malaysia, this traditional herb is often consumed as an herbal tea and has been used for many centuries for treating ailments, such as kidney stones, urinary tract infections, liver and bladder problems, and diabetes (Wagner 1982). Recent scientific findings show that the plant's methanol extracts contain compounds with antioxidant properties (Sahib et al. 2009). Moreover, its aqueous extract was noted to be effective in rats for alleviating hyperglycemia (Sriplang et al. 2007) as well as having diuretic effects (Adam et al. 2009). Results from these scientific studies have led *O. stamineus*-based products to be in high demand by the public. Consequently, this has created interest among farmers and investors to grow the herb as a plantation crop.

Since its establishment as an important cash crop, the herb has been notably free of serious insect problems until recently. In August 2009, the herb, grown in a backyard garden at Subang Jaya, Selangor, Malaysia, was heavily attacked by a relatively unknown lace bug. Several photographs of the lace bug were sent to Dr. Thomas J. Henry, a research entomologist from United States Department of Agriculture (USDA), Systematic Entomology Laboratory, Washington, D.C., and Dr. Masaki Tomokuni, a researcher at the National Science Museum, Tokyo. Both scientists identified the lace bug as *Cochlochila bullita* (Stål), commonly known as the ocimum tingid. This is the first record of its occurrence Malaysia and also the first record on the host plant, *O. stamineus*.

The lace bug, *Cochlochila bullita*

Cochlochila bullita, occurring widely in the Old World tropics, has been reported attacking *Ocimum kilmandscharicum* Linnaeus and *Ocimum sanctum* Linnaeus in India (Palaniswami and Pillai 1983). It also has been recorded from *Ocimum basilicum* Linnaeus, *O. sanctum*, *Coleus parviflorus* Benthham and many other Lamiaceae (Livingstone and Yacoub 1987). In Thailand, *C. bullita* is a serious pest of *O. basilicum* (Tigvatnnon 1989).

Cochlochila bullita's piercing-sucking mouthparts damage the host by removing nitrogen-rich plant fluids. This results in curling and drying of leaf tips, leaf dehiscence, and lowering the inflorescence production (Mohanasundaram and Rao 1973; Palaniswami and Pillai 1983). We observed such symptoms on *O. stamineus* infested with *C. bullita*. The adult lace bugs usually feed on tender shoots of the herb causing them to wilt and eventually die (Fig. 1 and 2), and in many instances, nymphs and adults feed



Figure 1-4. Feeding and damage of *C. bullita*. **1)** Adult of *C. bullita* feeding on *O. stamineus*. **2)** Wilted shoot caused by *C. bullita*. **3)** Nymphs of *C. bullita* feeding gregariously on *O. stamineus*. **4)** Seriously damaged *O. stamineus*.

gregariously on the leaves (Fig. 3), leaving tiny black spots of excrement on the upper surface of the leaves. Figure 4 shows a heavily damaged *O. stamineus* plants.

The oviposition pattern of *C. bullita* varied among the different host plants. For example, on *O. kilmandscharicum*, eggs were partially inserted obliquely into the stems or shoots, more often in groups than singly (Sharga 1953); whereas on *Mentha* sp., they were laid near the margin of the leaf (Samuel 1939). On *O. basilicum*, the eggs were deposited on the leaves and young branches singly or in clusters (Tigvattnanont 1989). *Cochlochila bullita* oviposited in young branches and leaves of *O. stamineus*. The eggs were inserted into the branches in clusters (Fig. 5) or singly into the veins of the leaf, leaving the operculum exposed (Fig. 6). The egg, 0.04 mm long, is oblong and dark brown (Fig. 7). Eggs hatched in 5-7 days and nymphal stages (instars I-V) lasted for about 10 days. Figure 8 shows the five nymphal instars of *C. bullita*. The adults lived for about 40 days.

The adult male and female are morphologically similar (Fig. 9), except the female is significantly larger with respect to the body length. The male is 2.12 ± 0.04 mm (n=10) while the female is 2.25 ± 0.02 mm (n=10). The female, however, can be differentiated from the male by the presence of an ovipositor whereas the male has a distinct genital capsule with hidden structures (parameres) (Fig. 10).

Discussion

The damage caused by *C. bullita* on the quality of *O. stamineus* can be very serious during the dry season. The lace bugs tend to reproduce profusely on new growth and nymphs invariably remain on the plant throughout the season. With their inherent water stress during the dry season, the plants wilt at a

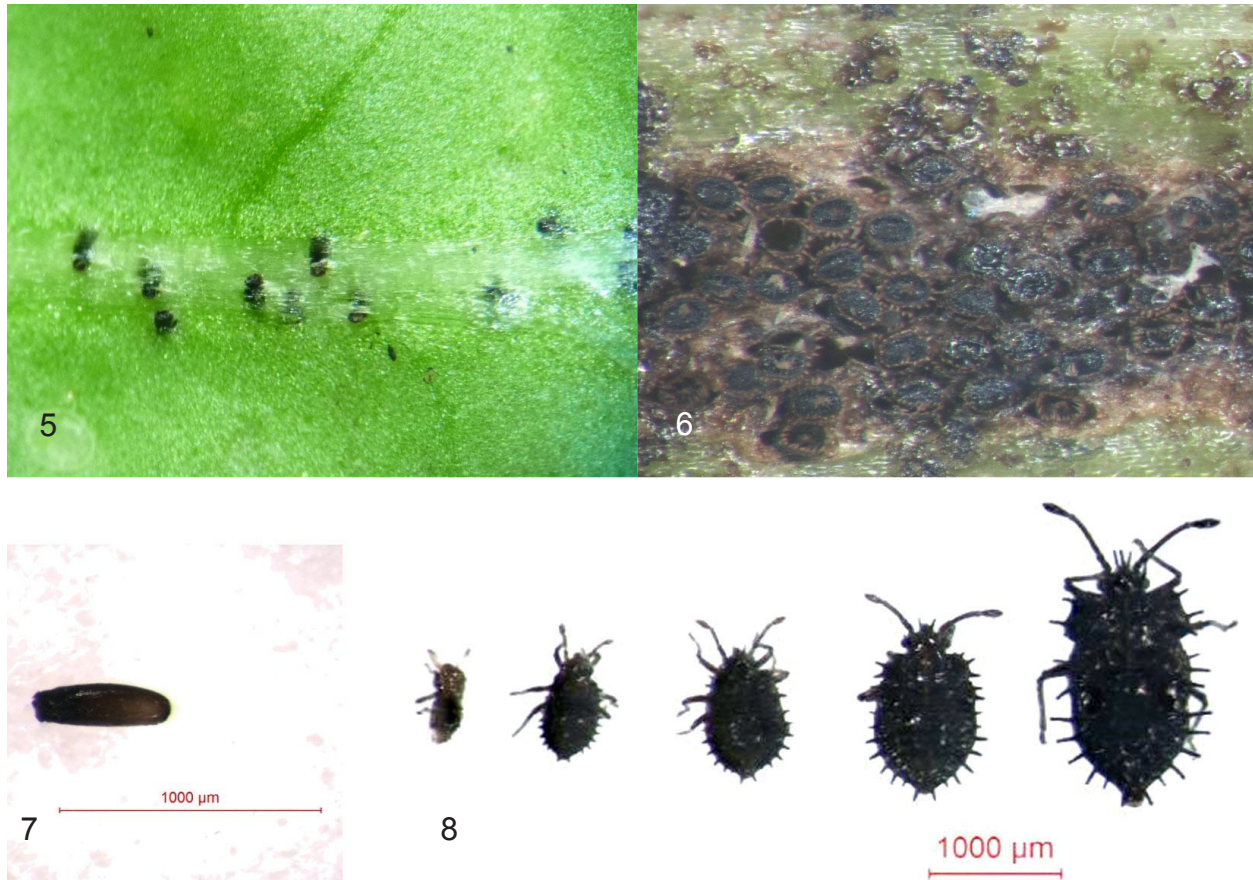


Figure 5-8. Life stages of *C. bullita*. **5)** Eggs inserted along midrib of a leaf. **6)** A cluster of eggs inserted in a shoot. **7)** An egg of *C. bullita*. **8)** Five nymphal stages of *C. bullita*.

much faster rate when *C. bullita* infestation is present. During the rainy season, less damage was observed and fewer lace bugs were present. This could be due to heavy rainfall dislodging lace bugs from the plants. Rainfall has been shown to affect the cochineal scale, *Dactylopius opuntiae* (Cockerell), an important biological control agent of the prickly pear cactus, *Opuntia ficus-indica* (Linnaeus) Miller. Mortality of this homopteran increased with the increasing duration of rainfall (Moran et al. 1987). In conclusion, our observations of the infestation pattern and the survival of *C. bullita* on *O. stamineus* indicate that this lace bug has the potential to be a serious pest of this medicinal plant.

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Literature Cited

Adam, Y., M. N. Somchit, M. R. Sulaiman, A. A. Nasaruddin, A. Zuraini, A. A. Bustamam, and Z. A. Zakaria. 2009. Diuretic properties of *Orthosiphon stamineus* Benth. *Journal of Ethnopharmacology* 124: 154-158

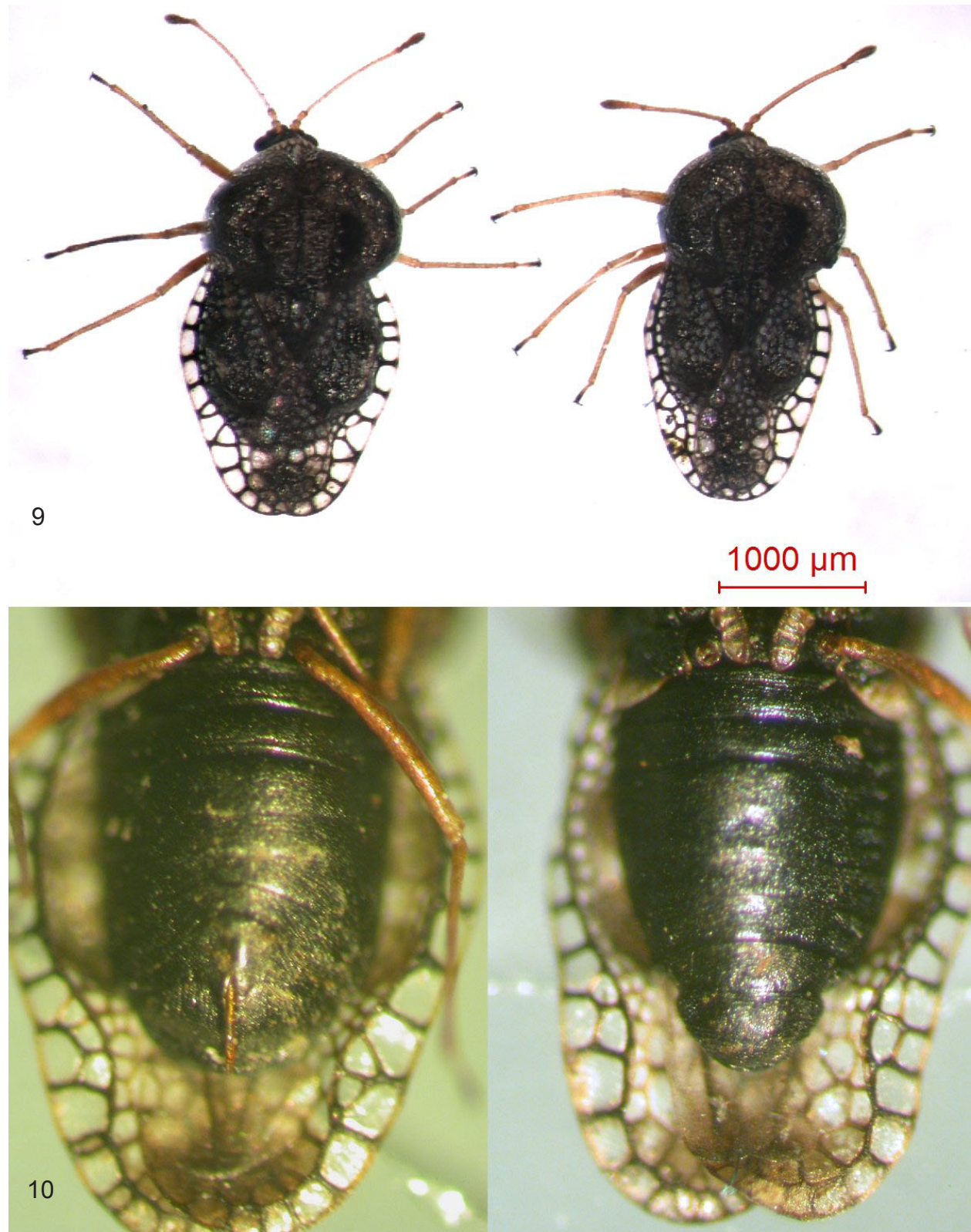


Figure 9-10. Adults of *C. bullita*. **9)** Dorsal view of a female (left) and male (right). **10)** Ventral view of female with an ovipositor (left) and male with a rounded genital capsule (right).

- Livingstone, D., and M. H. S. Yacoob. 1987.** Biosystematics of Tingidae on the basis of the biology and micro-morphology of their eggs. *Proceedings of the Indian Academy of Science (Animal Sciences)* 96: 587-611.
- Mohanasundaram, M., and P. V. S. Rao. 1973.** A note on *Cochlochila bullita* Horvath (Tingidae: Heteroptera) as part of *Coleus parviflorus*, a tuber crop in Tamilnadu. *Indian Journal of Entomology* 35: 346.
- Moran, V. C., J. H. Hoffmann, and N. C. J. Basson. 1987.** The effects of simulated rainfall on cochineal insects (Homoptera: Dactylopiidae): colony composition and survival on cactus cladodes. *Ecological Entomology* 12: 51-60.
- Palaniswami, M. S., and K. S. Pillai. 1983.** Biology of *Cochlochila bullita* S., a pest on Chinese potato. *Journal of Root Crops* 9: 59-62.
- Sahib, H. B., Z. Ismail, N. H. Othman, and A. M.,S. Abdul Majid. 2009.** *Orthosiphon stamineus* Benth. methanolic extract enhances the anti-proliferative effects of tamoxifen on human hormone dependent breast cancer. *International Journal of Pharmacology* 5: 273-276.
- Samuel, C. K. 1939.** Oviposition of the tingid *Monanthia globulifera* Wlk. *Indian Journal of Entomology* 1: 89-99.
- Sriplang, K., S. Adisakwattana, A. Rungsipipat, and S. Yibchok-Anun. 2007.** Effects of *Orthosiphon stamineus* aqueous extract on plasma glucose concentration and lipid profile in normal and streptozotocin-induced diabetic rats. *Journal of Ethnopharmacology* 109: 510-514.
- Sharga, U. S. 1953.** Bionomics of *Monanthia globulifera* Wlk. (Hemiptera-Heteroptera: Tingidae). *Journal of the Bombay Natural History Society* 51: 885-889.
- Tigvattnanont, S. 1989.** Studies on the bionomics and local distribution of some lace bugs in Thailand: I. *Monanthia globulifera* (Heteroptera: Tingidae). *Khon Kaen Agriculture Journal* 18: 200-212.
- Wagner, H. 1982.** *Pharmazeutische Biologie: Drogen und ihre Inhaltsstoffe* (2nd ed.). Gustav Fischer Verlag; Stuttgart. 238 p.

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