



論文内容の要旨

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題目 Oviposition and nymphal performance of the chrysanthemum lace bug *Corythucha marmorata* (Hemiptera: Tingidae) on newly acquired host plants, *Ipomoea batatas* cultivars

(新規寄主植物サツマイモの各品種におけるアワダチソウグンバイ *Corythucha marmorata* (カメムシ目: グンバイムシ科) の産卵および幼虫発育)

The horticultural field has been increasingly affected by invasions of exotic insects. The chrysanthemum lace bug, *Corythucha marmorata* (Heteroptera: Tingidae), is an invasive pest in Japan from the United States, known to have been expanding its host range in Japan from Asteraceae to Convolvulaceae and Solanaceae. To establish successful biological control, it is crucial to understand thoroughly the biology of the pest and the potential scenario that could happen in the future. However, the knowledge on biology and host plant use of *C. marmorata* is scarce. Especially the oviposition strategy of the mother has been little studied, even in true bugs.

The main question of this thesis was to understand the effect of original and new hosts, Asteraceae and Convolvulaceae plants, on nymphal performance and female response of *C. marmorata*. The study of *C. marmorata* suitability on Convolvulaceae plants is interesting to be further evaluated as this could be a raw manifestation of host range expansion. There are four outlines that can be stated from this thesis:

- 1) *C. marmorata* is a synovigenic insect which starts to develop mature eggs after adult eclosion and depends greatly on the food source in adult stage. Results showed that number of oviposited eggs was significantly affected by host plant and mother age, not by mother size. These results indicated that female allocation to fecundity is age- and resource-dependent, hence mother size was not crucial factor.

- 2) Plants affected *C. marmorata* nymphal survivorship significantly, but not development time and adult body size, thus the inferiority of the food plants may appear firstly on nymphal survival. However, female oviposition was significantly different among the plants, with positive relationship with nymphal survival, indicating that mother choice might largely affect offspring performance.
- 3) Female oviposition responses were further explored in the third chapter, where number of eggs laid, preoviposition period and size of late-laid eggs were significantly affected by host plants. Especially, late-laid eggs were larger on inferior than on superior host plants. This chapter suggested that females changed their egg size in response to the host plant quality so that nymphs could use supplemental nutrient to survive on inferior plants. This might be one of the mechanisms that promote host range expansion to relatively inferior plants.
- 4) In the last chapter, intra- and inter-specific variations of some leaf traits which may affect nymphal performance were examined. Trichome density had relatively high variance but did not have any correlation with nymphal performance. For chemical traits, carbon-based and nitrogen-based nutrients might be crucial for *C. marmorata* to initiate nymphal feeding and performance.

Comprehensive information about host plant use of *C. marmorata* and potential for adaptive evolution of host range were provided in this study. I conclude that the role of different host plants could affect *C. marmorata* nymphal survival, females response and potentially alter their egg size when they face inferior plants. Physical and chemical leaf traits on nymphal performance were not clear, but it might be important factor for the females to affect oviposition and offspring survival.