Utilization of the Symbiotic Fungus Propagated in Host-Tree before Oviposition by a Woodwasp, *Urocerus japonicus* (Hymenoptera: Siricidae)

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Abstract Most woodwasps (Siricidae) are symbiotically associated with the specific fungus, Amylostereum spp. Female adults inoculate the fungus during their oviposition in the sapwood of host trees. Woodwasp larvae can digest sapwood with low nutritional quality with the aid of symbionts. In an earlier study, we clarified that a woodwasp with no fungal symbionts, *Xeris spectrum* can utilize the fungal symbionts of other woodwasp species without possessing any symbiotic fungi of its own. Moreover, the larvae of fungus-carrying woodwasp species cannot develop on living trees. The female adults oviposit selectively on freshly killed trees that are presumed to be suitable for fungus propagation, because the conditions of the wood at the time of oviposition affect propagation of the fungus. Whether fungus-carrying woodwasps can develop using no maternal symbiotic fungus or not has never been studied. Thus, we conducted fungus-isolation and oviposition experiments to evaluate the preference and performance of *U. japonicus* on fungus-inoculated trees.

Experiments were conducted from 1999 to 2001. In July 1999, the first year, new female adults of *U. japonicus* were allowed to oviposit on living trees of *Cryptomeria japonica* (oviposited trees). In October, the symbiotic fungus of *U. japonicus* was artificially inoculated on living trees of *C. japonica* (inoculated trees). In November, oviposited trees, inoculated trees and control (not oviposited and not inoculated) trees were felled and a portion of the inoculated trees were bucked to 2 m lengths. In July 2000, the second year, new female adults were allowed to oviposit on each tree. At the same time, fungi were isolated from both oviposited and inoculated trees. In 2001, the third year, we counted the number of new adults that emerged from each tree where oviposition occurred in the 2nd year, and we also counted oviposition holes on each tree.

The inoculated symbiotic fungus propagated on both oviposited trees and inoculated trees 8 months after tree-felling, during the oviposition period of the next year. Moreover, the symbiotic fungus was distributed widely in the wood of inoculated trees, especially on bucked trees. Oviposition by *U. japonicus* was higher on oviposited and inoculated trees than on control trees; moreover, oviposition was higher on inoculated than on oviposited trees. On inoculated trees, many oviposition holes were observed near vertical lines from inoculated positions, where the symbiotic fungus had propagated vigorously. Next generation adults emerged from inoculated trees, whereas no adults emerged from oviposited and control trees. The number of emerged adults was especially high on bucked trees. From these results, we demonstrated that a fungus-carrying woodwasp species, *U. japonicus*, can reproduce using no maternal symbiotic fungus. Combined with results from a previous study, these results indicate that both *X. spectrum*, a woodwasp species that has no maternal symbiont, and *U. japonicus* a fungus-carrying woodwasp species, can utilize the *Amylostereum* fungi which had already propagated in the wood. This information is important for clarifying the coevolution between woodwasps and *Amylostereum* fungi.

KEY WORDS: *Amylostereum* fungus, fungus-isolation, oviposition preference, survival rate, *Urocerus japonicus*