

Prey-Predator Mutualism in a Tritrophic System on a Camphor Tree

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Abstract

We report the discovery of a mutualistic system encompassing prey-predator interactions. A domatium is a small space in a vein axil on the underside of leaves of woody angiosperms. *Cinnamomum camphora* Linn. has domatia that harbor a micro-phytophagous eriophyid mite (sp. 1). We previously reported that a predatory mite, *Euseius sojaensis* (Ehara), depends on this eriophyid mite as food. We revealed that *E. sojaensis* also preyed upon another eriophyid mite (sp. 2) that induces galls on the leaves, and that the mean area of *C. camphora* leaves with galls was usually less than half that of leaves without galls. We experimentally tested the effect of *E. sojaensis* on galls, and confirmed that the presence of *E. sojaensis* reduced gall induction. Therefore, *C. camphora*, eriophyid mite sp. 1, and *E. sojaensis* comprise a mutualistic system, in spite of the prey-predator interactions among them. The conventional concept of mutualism does not apply to such prey-predator interactions, so we defined them as “systematic mutualism.” Here, the system consists of three trophic levels, and individuals that constitute this system benefits from the other species that constitute this system.