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# The Role of Microbe Inside *Drosera spatulata*'s Mucilage



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**Host:** Dr. Isheng Jason Tsai 蔡怡陞研究員

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## Abstract

Carnivorous plants secrete digestive fluid for nutrient acquisition. Although the liquid provides extreme conditions with low pH value and hydrolytic enzymes, several studies found that microbial community inside the mucilage plays an important role for prey digestion. *Drosera spatulata* is a carnivorous plant that secretes mucilage to stick to insects. Its leaves are covered with “tentacles” ending in glandular heads. These heads include glandular cells which produce sticky mucilage. Unlike pitcher plants containing digestive fluid inside modified foliar structures, mucilage of *D. spatulata* is exposed to environment. External influences are especially important in determining the distribution and abundance of microorganisms. In this study, we characterised *D. spatulata* mucilage microbial communities from northern Taiwan by using amplicon sequencing. To identify the relationship between *D. spatulata* and microorganism, we inoculated microbes on *D. spatulata* and analyzed their gene expression. As the result, we found that the fungus *Acrodontium crateriforme* is the ecologically dominant species in *D. spatulata* mucilage. Based on the transcriptomes when encountering prey insects, we revealed a high degree of genetic co-option in each species during fungus-plant coexistence and digestion. Expression patterns of the holobiont during digestion further revealed synergistic effects in several gene families including fungal aspartic and sedolisin peptidases, facilitating the digestion of sundew’s prey, as well as transporters and dose-dependent responses in plant genes involved in jasmonate signalling pathway. This study shows that botanical carnivory is defined by multidimensional adaptations correlated with interspecies interactions.

**Keywords:** *Acrodontium crateriforme*, *Drosera spatulata*, interaction, mucilage, traps