

## **Ant-plant symbioses trade-offs and its role in forest restoration projects**

### **ABSTRACT**

Ant-plant symbioses are complex between-species interactions found only in the tropical environment. Typically, in such symbioses, plants provide housing structures and food to their ant symbionts. In return, the ants protect their plants' host against herbivore attack and additional nutrients to help with plants' growth. These win-win interactions range from facultative to obligate mutualism. This proposal aims to test the three main mechanisms: (1) by-product benefits, (2) partner fidelity feedback and (3) partner choice in stabilising the ant-plant mutualism. Understanding the mechanisms are crucial as they form the foundation of the ant-plant distribution and growth, in other words - the health of the myrmecophyte (ants-loving) trees in the forest ecosystem. Hence, ant-plant symbioses are an ideal model system for investigating the effects of anthropogenic changes, such as deforestation and climate change on the outcome of ant-plant mutualistic interactions. This project attempts to identify the mechanisms regulating the mutualistic interactions and, in particular, identify the context in which such mutualistic interactions evolved and adapt to the changing environment. We hypothesise that there will be a higher diversity of obligate mutualistic ant-plant interactions in the undisturbed environment compared to degraded habitat. Furthermore, we expect there are different complexity of symbioses, involving multiple partners (ants-hemipteran insects-bacteria-fungi-plants) that deepen our understanding of how such symbioses can be stabilised. Finally, the deforestation combined with climate change in Southeast Asia will have a detrimental effect on ant-plant symbioses, causing breakdown of mutualistic partners and invasion of cheater ant species that do not confer a protective advantage to their plants' host.