

## **Do epiphytes choose host plants randomly in a monsoon rain forest?**

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### **Summary**

Epiphytes are a group of unique plants which do not root in soils, but grow on surfaces of other plants. Epiphytes are an important components in many forest ecosystems, especially in humid forests. A substantial proportion of species richness, up to 30%, may be contributed by epiphytes in some tropical rainforests.

In this lecture, we will discuss the ecological relationship between epiphytes and their host plants. What is the nature of such relationships? Which resources do host plants provide? Do epiphytes require specific host plants? You will conduct a field experiment to explore epiphyte-host relationships in the Fushan Experimental Forest.

### **Key Concepts**

- Resource acquisition of land plants.
- Ecological and physiological differences between epiphytes and non-epiphytic plants.
- There are different types of interspecific interactions in a plant community: facilitation, competition, parasitism, commensalism, and neutral.
- Different levels of host specificity exist in epiphytes.
- Host plants may provide nutrients, moisture or structural supports for epiphytes.
- Developing null hypotheses is necessary to determine whether epiphytes choose host plants randomly.
- Epiphytes play important roles in nutrient cycles and the maintenance of species diversity in many forests.

### **Group Discussion**

The Fushan Experimental Forest is rich in epiphytes. For example, two fern species, *Asplenium antiquum* and *Haplopteris zosterifolia*, can be commonly observed in the forest. They root on the surface of trees at most times. Sometimes, these two species may co-occur (Please see the attached

photo that was taken from Jian et al. 2013).

Please use these two fern species as an example and list their potential survival challenges as epiphytes. You may consider the processes of resource acquisition of epiphytes. How do epiphytes acquire light, nutrients, and water? Which resource is most limited?

Among the above resources, which resources may epiphytes gain from host trees? Do such resources vary with tree size, species, or height? Please list different possible levels of host specificity. What does it mean to “choose host plants randomly”? How will you test the hypothesis of random selection?



### **Further Readings**

Callaway, R. M., Reinhart, K. O., Moore, G. W., Moore, D. J. and Pennings, S. C. 2002. Epiphyte host preferences and host traits: mechanisms for species-specific interactions. *Oecologia* 132: 221-230.

Jian, P.-Y., Hu, F. S., Wang, C.-P., Chiang, J.-M., and Lin, T.-C. 2013. Ecological facilitation between two epiphytes through drought mitigation in a subtropical rainforest. *PLoS ONE* 8: e64599.

Schnitzer, S. and Bongers, F. 2002. The ecology of lianas and their role in forests. *Trends in Ecology and Evolution*. 17. 223-230.

Wagner, K., Mendieta-Leiva, G., and Zotz, G. 2015. Host specificity in vascular epiphytes: a review of methodology, empirical evidence and potential mechanisms. *AoB Plants* 7: 1.