Plant specialization

Normally only ants living in mutualistic symbiosis with plants are specialized on distinct host plant taxa. In such systems, both ants and plants have developed coadaptations for their mutual benefit. In the *P. arachne*- and *P. hodgsoni*-bamboo association no specific adaptations were found in the plants. The ants, on the other hand, are apparently able to detect and select different species of broad-leaved bamboo as their habitat. The advantage of this specialization for the ants seems to be as follows: *P. arachne* and *P. hodgsoni* have large colonies. If such a colony gains its food mainly from Homoptera, collected in a large area and gathered in some pavilions, it is necessary to provide the mono- or at least oligophagous aphids and pseudococcids with their proper food plant. While in a tropical rainforest plants of the same species are only rarely clustered at one site but normally are scattered over a large area, the abundant and monophytous bamboo thickets warrant the proper food for the Homoptera in an optimal way. It is unclear up to know whether the ants should be regarded as parasites of bamboo because of the phloem sap loss caused by their homopterans, or are even beneficial for the plants by protecting them against phytophagous animals and by controlling the number of homopterans.

Competitors

On the studied bamboo plants occurred a large number of other ants, competing for (a) nest space in bamboo culms, (b) foraging area, and (c) trophobionts (*table 1*).

P. arachne and *P. hodgsoni* were never found nesting in bamboo culms lying on the ground, possibly due to strong competition from other ants nesting or foraging there. These are favored nestsites of other aggressive ant species with large colonies, e.g., of the genera *Camponotus, Leptogenys,* and *Odontomachus.* In addition, culms on the ground decay faster and cannot serve as a long-term nestsite.

The ecological specialization of *P. arachne* and *P. hodgsoni* leaves many niches for other species of ants on the same bamboo plant: Small species like *Crematogaster* can nest in bamboo culms too small for *P. arachne* and *P. hodgsoni* and can exploit food sources effectively by fast recruitment combined with effective fighting ability. They do not control a larger area but defend their trails and the surroundings of a food source (personal observations).

P. arachne and *P. hodgsoni* are only active during daytime. This leaves niches for ants active during the night. One species of *Polyrhachis* (*Myrma*) with a small colony size was found twice, one time nesting in an internode between two internodes occupied by *P. arachne,* the other time in an internode adjacent to a *P. arachne* nest. This species of *Polyrhachis* (*Myrma*) was not active during daytime. Also a nest of a colony founding queen of *Poly-*