DISCUSSION

Nests and pavilions

The biology of *P. arachne* and *P. hodgsoni* was hitherto mostly unknown. A few authors have described the nests, but in a contradictory manner. BINGHAM (1903) noted that both species are "nesting in the hollow joints of bamboos", while KARAVAIEV (1928, 1929) reported *P. arachne* as nesting below bamboo leaves. The only other statement on their nesting habits is from EMERY (1896) who mentioned that nests of *P. arachne* are 6 × 4 cm large silken chambers below the leaves of palm trees. We suppose that KARAVAIEV and EMERY had found pavilions but not nests. The pavilion below a palm tree leaf might be one at the margin of a colony's territory, as was the one we collected below a ginger leaf. All other findings, including those of BINGHAM in Burma, KARAVAIEV in Java, and ours in Malaysia, are exclusively from broad-leaved bamboo species.

Different levels of adaptation to an arboreal life are found in *Polyrhachis* (HUNG, 1967). As far as known, all Asian species of the primitive subgenus *Myrma* do not use silk for nest building. They forage both on the ground and on shrubs and trees and nest mainly in the ground, in dead branches on the ground, or in preformed holes in tree trunks (DOROW, unpubl.). The evolution of the use of silk enabled other *Polyrhachis* species to colonize the canopy: Suitable preformed nest cavities were no longer a limiting factor. Instead, nests could be built nearly everywhere in the canopy. The simplest way is to weave nests below or between leaves. This is the most common type of nest in *Polyrhachis* and is used in the subgenera *Cyrtomyrma* (HÖLLDOBLER and WILSON, 1983), *Myrmatopa, Myrmhopla,* and *Myrmothrinax* (DOROW, unpubl.).

We observed the queen of *P. hodgsoni* in a pavilion, the queen of *P. arachne* in a culm nest. BINGHAM's (1903) finding of *P. hodgsoni* nesting like *P. arachne* (if he was not mixing up pavilions and nests) suggests that there is some flexibility-at least in *P. hodgsoni,* possibly also in *P. arachne*-to switch between the ancient type of nestsite, preformed cavity, and the more evolved type, woven leaf nest. This flexibility enables these ants to maintain their habitat together with their trophobionts even when loosing their nestsite to stronger competitors. MUKERJI (1932) states this for the pavilions of *P. lacteipennis* Smith 1858 (*P. simplex* auct.): "occasionally used for temporary housing of the colony". So an accurate delimitation of the categories "nest" and "pavilion" is impossible, since they can be combined. In this connection it is remarkable that brood is not concentrated in the "nest" but is dispersed over the pavilions in *P. arachne* and *P. hodgsoni.* The derived below-leaf type of nest, which reduces the competition pressure for nestsites, is problably given up when the more stable, ancient preformed-cavity type