

Pollination mutualism between *Alocasia macrorrhizos* (Araceae) and two taxonomically undescribed *Colocasiomyia* species (Diptera: Drosophilidae) in Sabah, Borneo

Abstract

Two taxonomically undescribed *Colocasiomyia* species were discovered from inflorescences of *Alocasia macrorrhizos* in Kota Kinabalu City, Sabah, Borneo, Malaysia. The aims of this study were to investigate the reproductive ecology of the flies and the plant, ascertain the importance of the flies as pollinators and examine the intimate association between flowering events and life history of the flies. We conducted sampling, observations and field pollination experiments. The flies were attracted by the odour of female-phase inflorescences in the early morning on the first day of anthesis. They fed, mated and oviposited in the inflorescences for 1 day. On the second day, the flies, covered with pollen grains, left the male-phase inflorescences for the next female-phase inflorescences. The immature forms of both fly species hatched, developed and pupated within the infructescences without damaging the fruits, and developed adults emerged when the mature infructescences dehisced. The flowering events and fly behaviours were well synchronized. In field pollination experiments, inflorescences bagged with a fine mesh (insect exclusion) produced almost no fruits, whereas those bagged with a coarse mesh (bee exclusion) produced as many fruits as the open-pollinated controls. These results indicate that these flies are the most efficient and specialised pollinators for their host, *A. macrorrhizos*. These flies, in return, depend on *A. macrorrhizos* for food and habitat through most of their life cycle. This study provides a deeper insight into the less recognised, highly intimate pollination mutualism between Araceae plants and *Colocasiomyia* flies.