



Ontogeny of familiarity with foraging landscape and foraging abilities in the tropical social wasp *Ropalidia marginata*

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Possessing spatial familiarity with their foraging landscape may enable animals to reduce foraging effort without compromising on foraging benefits. For animals inhabiting feature-rich landscapes, spatial familiarity can increase with increasing age/experience. To check whether this holds for individually foraging tropical social wasp *Ropalidia marginata*, we recorded the number and duration of all foraging trips, the identity of the materials brought to the nest (building material, water or food) and the directions of outbound and inbound flights (relative to their nests) of known-age foragers from three natural colonies, each for three consecutive days. The average trip duration and time spent daily in foraging increased rapidly until about first four weeks of their life, during which they rarely brought food to their nest, although many of them brought building material and water. Thereafter, their average as well as per day duration of foraging trip started decreasing gradually. Nevertheless, their foraging efficiency and success for food kept on increasing monotonically with age. These results suggest that older wasps were more efficient in foraging despite spending less time doing so. With increasing age, wasps developed individual preferences for the direction of their outbound flights, increased directionality of their inbound trips as well as the angular difference between their outbound and subsequent inbound flights, indicating development of spatial memory. We conclude that wasps acquire familiarity with their foraging landscape in their initial foraging phase and gradually develop robust memory for rewarding sites and routes to those sites, which enables them to increase their foraging capabilities.