

Nest Hydrocarbons as Cues for Philopatry in a Paper Wasp

A. Sumana*, Aviva E. Liebert*, Anne S. Berry†, Ghislaine T. Switz*, Colin M. Orians* & Philip T. Starks*

**Department of Biology, Tufts University, Medford, MA; †Oberlin College, Oberlin, OH, USA*

Abstract

Philopatric behavior has been demonstrated in a wide taxonomic spread of animals. In temperate environments, overwintered *Polistes* wasp foundresses often return to their natal nest prior to initiating colony construction. Previous research has shown that these spring foundresses can identify the natal nest in the absence of landmark and gross morphological cues. Hydrocarbons are essential recognition cues for *Polistes* nest and nestmate discrimination, but cuticular hydrocarbon profiles can become homogenized when foundresses overwinter in mixed colony groups. We examined the hydrocarbon profiles of *Polistes dominulus* foundresses and nests before and after an overwintering period, and found that the hydrocarbon profiles of nests remain unique over time and that this uniqueness is influenced by the original foundresses. Our data raise the possibility that in returning to the natal nest, foundresses reacquire their colony-specific signature, which may play a role in the formation of cooperative associations.

Correspondence: Philip T. Starks, Department of Biology, Tufts University, Medford, MA 02155, USA. E-mail: philip.starks@tufts.edu

Introduction

Philopatry is a phenomenon observed in many invertebrate and vertebrate animal species. Derived from the Greek for 'home loving', philopatry describes the tendency of animals to remain at certain locations or to return to them (Wilson 1975; Greenwood 1980). There are two forms of philopatry: one in which the animal spends its whole life at the natal site, and another in which the animal spends part of its life away from the natal site and then returns. Both types of philopatry can influence spatial characteristics of populations such as location and density, as well as the formation of social groups such as kin associations (Greenwood 1980; Wolff 1999).

The first type of philopatry, lifetime habitation in the natal territory, is a behavior that can be exhibited by one sex (male or female) or by both sexes. The