Andersson, S. 2001. FLORAL SCENTS IN BUTTERFLY FORAGING AND POLLINATION

Chemical Ecology, Department of Botany, Göteborg University,
Carl Skottsbergs Gata 22B, Box 461, SE-405 30 Göteborg, Sweden

ABSTRACT: The ecological interaction between foraging butterflies and the plants they pollinate has been studied with focus on the role of floral scent, the chemical signal of this interaction. The following questions were addressed: (1) Do butterflies have an innate preference for certain floral scents? (Papers I and II); (2) Do butterflies have an ability to change floral scent preferences? (Papers I and II); (3) Which are the most important compounds in the floral scent for foraging butterflies? (Papers I and II); and (4) Which are the floral scent compositions among butterfly-pollinated plants? (Papers III, IV, and V).

The behavioural responses in butterflies to floral scents were studied in bioassays with free flying butterflies, which were allowed to make choices between different floral models. Floral scent compositions were revealed by headspace collection and combined gas chromatography and masspectrometry analyses (GC-MS). The antennal receptivity was recorded with combined gas chromatography and electroantennographic detection analyses (GC-EAD).

The results from the thesis demonstrate that there is (1) an innate preference in temperate butterflies for floral scents from butterfly pollinated plants, and an innate preference in the tropical butterfly *Heliconius melpomene* for floral scent from the butterfly pollinated plant *Lantana camara*, compared to the scent of vegetative parts of the plant; (2) an ability, in the temperate butterflies, to switch preference of different floral scents to the one most recently rewarding; (3) a higher antennal response to floral scent compounds of exclusive floral origin that are also emitted in large relative amounts; and (4) a dominance of certain benzenoid compounds, monoterpenes, and irregular terpenes in many of the butterfly pollinated plants, which may be plant adaptations matching the olfactory requirements of butterflies.

KEYWORDS: Floral scents, foraging, nectar search, pollination, Lepidoptera, butterfly, *Heliconius melpomene, Inachis io, Aglais urticae, Gonepteryx rhamni.*

Göteborg 2001

ISBN 91-88896-35-8

Printed in Sweden by Kompendiet, Göteborg