PHEROMONE DIFFERENCES BETWEEN SIBLING TAXA

*Diachrysia chrysitis* (LINNAEUS, 1758) AND *D. tutti* (KOSTROWICKI, 1961) (LEPIDOPTERA: NOCTUIDAE)

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Abstract—The noctuid sibling taxa *Diachrysia chrysitis* s. str. and *D. tutti*, of yet uncertain taxonomic status, have previously been shown to possess differences in morphology and to be attracted to different mixtures of the two presumed pheromone components (Z)-5-decenyl acetate and (Z)-7-decenyl acetate. Typical *D. tutti* males (clearly broken forewing marking) are known to respond to a 2:100 mixture of the two isomers, whereas *D. chrysitis* males (unbroken marking) are attracted to a 100:10 mixture. We investigated female pheromone production and male electroantennographic (EAG) response in *Diachrysia* families raised in the laboratory from field-collected gravid females. Extracts of individual females from typical *D. tutti* and *D. chrysitis* families were subjected to gas chromatography with simultaneous flame ionization and electroantennographic detection. All females produced mixtures of Z5– and Z7–10:OAc, but female *D. chrysitis* produced predominantly Z5–10:OAc.

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and the antennae of their brothers responded more strongly to the Z5 peak than to the Z7-10:OAc peak, whereas the opposite was true for D. tuttii families. The pheromone components were shown to be biosynthesized from hexadecanoic and tetradecanoic acid, respectively by Z11-desaturation followed by chain shortening, reduction, and acetylation. The EAG responses of males trapped with the typical D. tuttii and D. chrysitis blends, as well as with an intermediate blend, were investigated. Males trapped with the D. tuttii mixture almost exclusively had a clearly broken wing marking and showed strongest EAG response to Z7-10:OAc. The intermediate blend and the D. chrysitis mixture gave more mixed catches, but with a prevalence of males with an unbroken (or almost unbroken) wing marking and with a higher mean response to Z5-10:OAc. Some males with typical D. tuttii EAG responses were attracted in the field to the D. chrysitis pheromone. In the flight tunnel some D. chrysitis males were attracted also to the D. tuttii mixture. This indicates that cross attraction may take place between the two taxa under natural conditions.

Key Words—Lepidoptera, Noctuidae, Diachrysia chrysitis, Diachrysia tutti, pheromones, sibling taxa, electroantennographic responses, biosynthesis, cross-attraction.

INTRODUCTION

In his taxonomic revision of palearctic Plusiinae, Kostrowicki (1961) described Diachrysia tutti as a species that could be separated from D. chrysitis (Linnaeus, 1758) on morphological grounds. According to Kostrowicki the two taxa appear sympatrically in Europe, Asia Minor, Iran, and the Caucasus, whereas only D. tutti occurs east of the Urals. Kostrowicki’s distinction between the two taxa was, however, not confirmed by other taxonomists, and D. tutti was generally considered a synonym of D. chrysitis (Lempke, 1965; Urbahn, 1966, 1967) until Priesner (1985) reported the attraction of two distinct Diachrysia populations, assignable to D. tutti and D. chrysitis, to two different mixtures of (Z)-5-decenyl acetate (Z5-10:OAc) and (Z)-7-decenyl acetate (Z7-10:OAc). Typical D. tutti specimens have a clearly broken forewing pattern (Wp 1; confluence grades 1 and 2 according to Rezbanyai-Reser, 1985), and such males are attracted to a 2:100 mixture of Z5-10:OAc/Z7-10:OAc, whereas D. chrysitis males with an unbroken wing pattern (Wp 5) are attracted to a 100:10 mixture. The chrysitis sex attractant rarely attracts males with Wp 1 and few males with Wp 5 are found in tutti traps, but insects with intermediate wing patterns (grades 2–4) are frequently found in both kinds of traps (Priesner, 1985; Rezbanyai-Reser, 1985; Töth et al., 1988; Svensson et al., 1989).

Allozyme analysis of males trapped with the two types of sex attractants demonstrated that the samples were similar but not identical with respect to allele frequencies. However, no diagnostic loci were found, and the allozyme data were not clear in terms of cross-attraction and reproductive isolation (Svens-