ACCUMULATION OF *Dendrobium superbum* (ORNIDACEAE) FRAGRANCE IN THE RECTAL GLANDS BY MALES OF THE MELON FLY, *Dacus cucurbitae*

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Abstract—4-(4-Hydroxyphenyl)-2-butanone was characterized from flowers of the orchid *Dendrobium superbum* as a specific attractant factor for the male melon fly, *Dacus cucurbitae*. The male flies compulsively licked the flower surface and sequestered the compound in significant quantities in their rectal glands. The compound was detected within 6 hr after ingestion and was retained for more than six days in the rectal gland sacs.

Key Words—*Dacus cucurbitae*, melon fly, Diptera, *Dendrobium superbum*, orchid, 4-(4-hydroxyphenyl)-2-butanone, cue-lure, sequestration, pheromone.

INTRODUCTION

Males of the melon fly, *Dacus (Bactrocera) cucurbitae* Coquillett, show strong affinity to the blossoms of the orchid, *Dendrobium superbum* Rchb. f. (synonym, *D. anosmum* Lindl.) (Flath and Ohinata, 1982; Ichinohe et al., 1983) (Figure 1). Flath and Ohinata (1982) identified several volatile components including benzylacetone (4-phenyl-2-butanone) by a headspace collection of *D. superbum*

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flowers. According to our behavioral bioassay, however, the activity of the major attractant chemical in *D. superbum* flowers was more potent than benzylacetone and exhibited a more polar nature on the silica gel chromatography. We have reexamined the attractant chemicals contained in the flowers of *D. superbum*.

Males of *D. cucurbitae* possess a rectal gland complex (Schultz and Boush, 1971) and produce a smokelike substance from the gland during courtship (Kobayashi et al., 1978; Ohinata et al., 1982, Kuba and Sokei, 1988). Alkyl amides, nonan-1,3-diol, 4-hydroxybenzoic esters, and pyrazine derivatives have been identified as the major volatile components of the rectal glands (Baker et al., 1982; Nishida et al., 1990; Perkins et al., 1990). We will demonstrate here the selective accumulation of a *Dendrobium* flower fragrance in the rectal gland, suggesting a possible biological role of the compound in courtship behavior of *D. cucurbitae*.

**METHODS AND MATERIALS**

*Insects.* We used two types of melon fly strains, the mass-reared Okinawa strain (Hibino and Iwahashi, 1990) and the Malaysian strain (Nishida et al., 1990). Larvae were reared with an artificial diet (Okinawa strain) (Nakamori