photoreceptor within the last abdominal ganglion [8] is involved in the response, and that inputs from the anterior part of the nervous system modulate the response.

At the initial stage of copulation behavior, the male opens the valva widely, hooks part of the female's genitalia with the dorsal hook, the superuncus [4], closes the valva, and then proceeds to the next step, insemination. Instead of proceeding to insemination immediately after the closing of the valva, the male usually repeats the opening and closing of bilateral valvae several times. This action probably stabilizes the copulatory posture. The photoreceptive site 1 (P1) in the male scaphium is covered during copulation, because the male pinches the female's genitalia tightly with the scaphium and the superuncus. If the male P1 is not covered, this means that the copulatory posture may not be perfect. The posture then needs to be corrected. Preliminary behavioral observations suggest that the male may on occasion release the female by opening the valva, apparently in an attempt to achieve the correct posture for proper insemination.

The photoreceptive area on the genitalia consists of only four photoreceptor cells [6]. These four photoreceptors essentially provide four separate eyespots, which, rather than being involved in resolving images, function simply to detect whether or not a particular domain of the body surface is covered. In the behavioral context described here, the eyespots, at least the P1s, may function as proprioceptors that monitor the copulatory posture.

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Aggregation Pheromones of Two Asian Palm Weevils, *Rhynchophorus ferrugineus* and *R. vulneratus*

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Two sympatric species of palm weevil, *Rhynchophorus ferrugineus* (Oliv.) and *R. vulneratus* (Panz.) (= *R. schach*) (Coleoptera: Curculionidae) [1], are important pests of coconut, oil palm, sago and aren palms in South and Southeast Asia [2,3]. Adults are attracted to wounded palms where eggs are laid [3–5]. The larvae tunnel into the terminal bud or trunk of the tree, leading directly to its death.

Aggregation pheromones have recently been identified for *R. palmarum* (L.) [2-methyl-5-(*E*)-hepten-4-ol] [6,7] and *R. phoenicis* F. (3-methyl-4-octanol) [8]. We report for the first time the identification, antennal perception, and behavioral activity of two male-produced pheromones for *R. ferrugineus* and *R. vulneratus*.

Twenty male and 20 female *R. ferrugineus* and 25 male and 25 female *R. vulneratus* were aerated separately for 1 week in modified Nalgene desiccators containing sugarcane [7]. A vacuum pump was used to draw charcoal-filtered air through the chambers and then through Porapak Q filters to capture insect- and host-produced volatiles. Volatiles were eluted from the Porapak Q with pentane and concentrated by distillation.

Analyses of volatile extracts with coupled gas chromatographic-electroantennographic detection (GC-EAD) [9] revealed in both species the presence of two male-specific compounds that elicited strong electrical potentials by male and female antennae (Fig. 1). The mass spectrum of the second EAD-active compound (*2*, Fig. 2) in *R. ferrugineus* and *R. vulneratus* was identical to that of a minor male-produced compound in the American palm weevil, *R. palmarum*. It

