

TABLE II  
ALARM SUBSTANCES IN ANTS

Species	Chemical	Glandular Source	Authority
<b>PONERINAE</b>			
<i>Pachycondyla harpax</i> (Fabricius)	?	mandibular gland	Blum (9)
<i>Paraponera clavata</i> (Fabricius)	?	mandibular gland	Wilson (203)
<b>DORYLINAE</b>			
<i>Eciton hamatum</i> (Fabricius)	?	head (mandibular gland?)	Brown (25)
<i>Nomamyrmex esenbecki</i> (Westwood)	?	head (mandibular gland?)	Brown (25)
<i>Labidus proedator</i> (Smith)	?	head (mandibular gland?)	Brown (25)
<b>MYRMICINAE</b>			
<i>Aha sexdens rubropilosa</i> Forel	Citral	mandibular gland	Butenandt, Linzen & Lindauer (26)
<i>Pogonomyrmex badius</i> (Latreille)	?	mandibular gland	Wilson (196)
<i>Solenopsis saevissima</i> (Smith)	?	head	Wilson (200)
<b>DOLICHODERINAE</b>			
<i>Iridomyrmex pruinosus</i> (Roger)	2-heptanone*	anal gland	Wilson & Pavan (208)
<i>Tapinoma sessile</i> (Say)	?	anal gland	Wilson & Pavan (208)
<i>Monacis bispinosa</i> (Olivier)	?	anal gland	Wilson & Pavan (208)
<i>Liometopum occidentale</i> Emery	?	anal gland	Wilson & Pavan (208)
<b>FORMICINAE</b>			
<i>Lasius fuliginosus</i> (Latreille)	$\beta$ (4:8-dimethylnona-3,7 dienyl) furan (=dendrolasin)	mandibular gland	Pavan (121)
<i>Acanthomyops claviger</i> (Roger)	citronellal, citral (9:1 proportion)	mandibular gland	Ghent (57)

\* Identification by M. S. Blum.

natural responses. Tactile and auditory stimuli probably play some role in alarm communication, but this increasingly appears to be a secondary one.

*Other pheromones*—Stumper (156) has demonstrated that queen attractants of certain species can be transferred to "dummy" queens of elder pith and still induce the well-known worker responses of clustering, licking, and transport. Wilson (200) reported the extraction of a substance from worker fire ants that causes grooming behavior. A gaseous product, probably carbon dioxide, was also found to attract and settle fire-ant workers. The removal of worker corpses from the nest is caused entirely by perception of certain decomposition products, notably long-chain fatty acids and their esters (207). Francfort (54) has described an experiment which indicates that a chemical stimulus is responsible for the well-known phenomenon of social facilitation among workers. [For a review of the literature on facilitation in ants, see (139).] Larvae almost certainly produce pheromones peculiar to themselves. Their surface attractants are well known. Also, the hungry larvae of some species apparently produce chemical cues that guide nurse workers to their mouthparts (107, 203). It is possible that larvae also discharge excitants that induce