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RESEARCH NOTE

CHEMICAL ATTRACTION OF CRAB SPIDERS (ARANEAE, THOMISIDAE) TO A FLOWER FRAGRANCE COMPONENT

How crab spiders choose their hunting sites has been investigated in only one species, *Misumena vatia* (Clerck 1757) from North America (Morse & Fritz 1982; Morse 1988, 1993; Greco & Kevan 1994). Morse (1988) and Greco & Kevan (1994) stated that visual and tactile cues are crucial for finding and selecting hunting sites. Although chemical stimuli seem to be important for orientation and behavior of spiders (Tietjen & Rovner 1982; Barth 1993), the importance of chemicals for finding hunting sites has never been tested. However, recently, Aldrich & Barros (1995) reported that male crab spiders of four *Xysticus* Koch 1835 species were attracted by *(E)*-2-Octenal and *(E)*-2-Decenal.

During a project on scarab beetles (Coleoptera, Scarabaeoidea) in the Ivory Coast, we tested whether some lures attract beetles and other arthropods. These experiments were mainly unsuccessful. However, we caught some crab spiders (Thomisidae) with one type of lure, eugenol.

We conducted our experiments in the Parc National de la Comoé in the northeastern Ivory Coast (= Côte d'Ivoire, West Africa) in the Guinea savanna region (Porembski 1991). All traps were situated in the savanna near the gallery forest of the river Comoé near the research camp of the University of Würzburg (Lola Camp; 8°45′08″N, 3°49′02″W). We ran the trapping experiments between 11 June–10 July 1995.

We used pitfall traps, without preservation fluids, made of a blue plastic funnel of about 10 cm diameter placed on the top of a transparent plastic cup (diameter 8 cm, height 10 cm). The bait was placed at the bottom of the funnel. In most of the traps only the lower half was embedded in the ground.

We used eugenol (2-Methoxy-4-(2-propenyl)phenol = 4-allyl-2-methoxy-phenol = 3-(3-methoxy-4-hydroxyphenyl)prop-1-ene) of Fluka Chemie AG, Buchs, Switzerland (purity ≥ 99%; Ch.Nr.: 337412/1-794), 10 drops (14./18.VI.) or 5 drops (19.VI.-04.VII.) on bathroom tissue paper (brand Lotus, made by SATOCI, Abidjan) in each trap. As a control, we use our experiments with other chemicals (anethole, cinnamyl alcohol, geraniol (Fluka), and ethyl chrysanthemumate (ICN, Costa Mesa, California, USA). The spider species were identified by Dr. A. Dippenaar-Schoeman, Institute for Plant Protection, Pretoria. The specimens are deposited in the collection of the Institute for Plant Protection, Pretoria.

In eugenol baited traps we found seven individuals of two species of Thomisidae (Table 1). In contrast, with the control traps, no Thomisidae were caught (Table 2). Since Thomisidae were caught only in traps baited with eugenol, whereas no crab spiders were attracted to control traps, we postulate that eugenol served as an attractant for these spiders. Both *Thomisus blandus* Karsch 1880 and *T. daradoides* Simon 1890 were first recorded from the Ivory Coast by Dippenaar-Schoeman (1983). Only two specimens of *T. blandus* were collected at Zatta (6°52′N, 5°24′W) and Kossou (6°57′N, 4°48′W), and one specimen of *T. daradioides* at Kossou (geographical coordinates according to Office of Geography 1965). No further records from this country are known. Hence, our present records are the second one of *T. daradioides* and the third one of *T. blandus* from Ivory Coast.

Eugenol causes behavioral reactions in many insect species. It serves as a repellent or deterrent to some Coleoptera (Hassanali et al. 1990 [Curculionidae]), Diptera (Girolami et al. 1981 [Tephritidae]; Vartak et al. 1994 [Muscidae, Culicidae]), Lepidoptera (Hattori et al. 1992 [Pyralidae]), and Blattodea (Vartak et al. 1994 [Blattidae]), and as an attractant to Lepidoptera (Dethier 1947: 97 [Tortricidae]), Hymenoptera (Rebêlo & Garófalo 1991 [Apidae] Allsopp 1992 [Scoliidae]), Diptera (Sharma & Saxena 1974 [Muscidae]), and Co-

Table 1.—Species of Thomisidae caught by eugenol traps. Imm. = immature specimen. Date and time of collection in parentheses. Areas: I: at the boundary between gallery forest and savanna. II: savanna about 50 m away from the gallery forest. III: savanna about 100 m away from the gallery forest).

Species/area	I	II	III
Thomisus daradioides			1 ♀ (19 June 1995, 1200 h) 1 ♂ (19 June 1995, 1100 h)
Thomisus blandus	1 ♀ imm. (29 June 1995, 1145 h) 1 imm. (01 July 1995, 1700 h)	1 imm. (03 July 1995) 1 imm. (04 July 1995)	
Thomisidae sp.			1 spm. (14 June 1995, 1200 h; not conserved)

leoptera (Thomas & Hertel 1969 [Curculionidae]; Hesler et al. 1994 [Chrysomelidae]; Mactô et al. 1995 [Scarabaeidae, Cerambycidae]).

Eugenol is a common essential oil present in plant species of different families all over the world (Gildemeister & Hoffmann 1966: 430ff; Knudsen et al. 1993: 266; Pauli 1994: 26). Since it is often a component of flower fragrances, it could be directly associated with the hunting sites of those crab spiders species which are waiting on flowers for prey.

According to Dippenaar-Schoeman (1983), both *Thomisus blandus* and *T. daradioides* were collected mainly from flowers. Hence, they probably use flowers as hunting sites. Thus, the ability to use a flower fragrance component as an attractant would be an advantage for these species in finding their hunting sites.

The present record is the first indication of attraction of Thomisidae to a floral fragrance component. The above-mentioned aldehydes *(E)*-2-Octenal and *(E)*-2-Decenal that attract Thomisidae may be identical to or components of the pheromones of the *Xysticus* females (Aldrich & Barros 1995) or else, being the main components of the defensive secretions of bugs (Heteroptera), may indicate the presence of a potential prey. Eugenol, however, gives an indirect information about the presence of a potential prey to the spiders by indicating the prey's feeding place, a fragrant flower.

Table 2.—Trapping time and captured Thomisidae specimens. Others: anethole, cinnamyl alcohol, geraniol: 1702 h each; ethyl chrysanthemumate: 124 h.

Lure	Trapping time	Specimens
eugenol	2629 h	7
others	5714 h	0

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