

## Expansion of the *Sceliphron caementarium* (Drury) population east of Toulon (Hymenoptera: Sphecidae)

by

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ABSTRACT. — Females, males and clay-nests of the American mud-dauber wasp, *Sceliphron caementarium*, were collected near Salins d'Hyères, Var, France. The colour patterns, the position of the nests, and an aspect of the sexual behaviour are described and discussed in relation to both American and other European observations.



Fig. 1. *Sceliphron caementarium*. Top: female, bottom: male and female.

### Introduction

The American mud-dauber wasp *Sceliphron caementarium* (Drury) was first captured in the south of France, west of Toulon, in 1970 in Sanary-sur-Mer, Var, and later on in Cassis and La Ciotat (Bouches-du-Rhône) and in Cabanes du Pérols (Hérault) (Leclercq, 1976; Leclercq &

Table 1. Evaluation of colour patterns of *S. caementarium* according to a scoring system by Van der Vecht & Van Breugel (1968).

Thorax:	only the tegulae yellow	0
	markings more or less yellow	1
	markings complete (pronotum, mesepisternum, scutellum, postscutellum)	2
Propodeum:	black	0
	declivity more or less yellow	1
	basal spots and declivity yellow	2
	dorsal side also yellow	3
Gastral petiole:	black	0
	partly yellow	1
	entirely yellow	2
First gastral tergite:	black	0
	spots or narrow band	1
	wide apical band (at least half of the length) to entirely yellow	2

Table 2. Colour patterns of *S. caementarium* found in the vicinities of Giens and Salins d'Hyères (Var, France), evaluated according to the scoring system described in table 1.

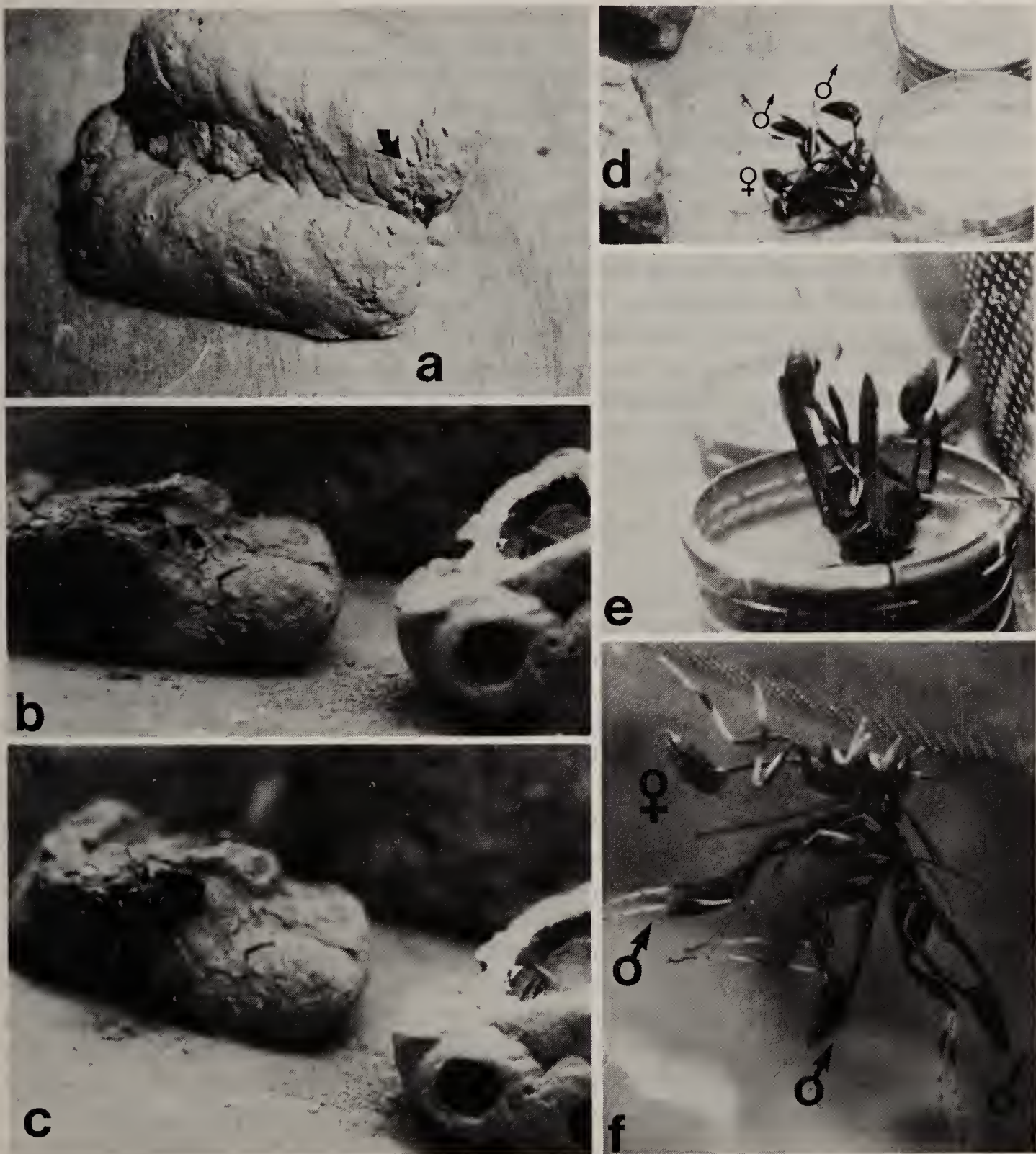
T = thorax, P = propodeum, GP = gastral petiole, GT = first gastral tergite.

			T	P	GP	GT
	1♂	Giens	2	3	0	1
	1♂	Giens	2	2	0	1
	1♀	Giens	2	2	0	0
	1♀	Giens	2	0	0	1
	4♀	Salins d'Hyères	2	3	0	1
	2♀, 3♂	Salins d'Hyères	2	2	0	1
	1♀, 1♂	Salins d'Hyères	2	2	0	0-1*
	1♀	Salins d'Hyères	2	2	0	0
	4♂	Salins d'Hyères	2	1	0	1
	1♀	Salins d'Hyères	2	0	0	1
	1♂	Salins d'Hyères	1	0	0	1
11♀, 11♂		mean	1.955	1.773	0.0	0.864
		SEM	0.044	0.203	0.0	0.066
		n	22	22	22	22
Wasps from Hérault,		mean	1.729	0.917	0.042	1.188
calculated from		SEM	0.098	0.048	0.041	0.121
Leclercq & Claparède (1978)		n	24	24	24	24

\* 0-1, and also 0-1 and 1-2 in the table by Leclercq &amp; Claparède (1978) has been counted as 0.5 and 1.5 respectively.

Claparède, 1978). In 1982 R. L. Veenendaal collected two females and two males, near Giens (Presqu'île de Giens, Var) east of Toulon, and in 1984 the author collected seven females and one male at the northern boundary of the old Salins d'Hyères, about 10 km north-east of Giens. Moreover, two females and eight males emerged from two clay-nests which have been collected in the latter area. The present paper describes the colour patterns of the wasps collected near Giens and Salins d'Hyères, their nest positions, and an aspect of the sexual behaviour in captivity.





**Fig. 2.** a, Clay nest of *S. caementarium* removed from the bottom of a stone. The arrow shows the site where the cell was closed, and where the young wasp will eclose; b, The young wasp removes the cover with its mandibles; c, Eclosion; d, The struggle-like mating act of one female and two males; e, A couple eating honey; f, A quadruplet of one female and three males just settled after a flight.

#### Colour patterns of *Sceliphron caementarium*

Wasps were collected in the last week of June, 1982, north of Giens (43°2'33" latitude, 6°8'32" longitude) and in the first week of July, 1984, north of Les Vieux Salins d'Hyères (43°7'4" latitude, 6°13'22" longitude). Females were captured in the vicinity of Salins d'Hyères while they were collecting clay near an irrigation system. The male was captured from a flower (Umbelliferae). Two nests were found at a distance of about 100 meters from the irrigation system, under stones with a diameter of about 40 cm in a field that may have been used for agricultural purpose in the past.

Similar to *Sceliphron* species these wasps are mostly black and frequently have some charac-



teristic yellow spots or body parts (fig. 1). According to Van der Vecht & Van Breugel (1968) it is neither possible nor desirable to describe the variation in colour of subspecies from the American continent. Yet, they regard descriptions of the colour pattern useful, for populations which have recently become established outside the original (American) range. A detailed study of the colour patterns might provide information about the origin of the immigrants and further it would be of interest to investigate whether patterns are likely to change within a certain period of time. For this purpose Van der Vecht & Van Breugel (1968) have developed a scoring system for the colour variation of *S. caementarium*, which is presented in table 1.

The colour patterns of the wasps collected at Giens by R. L. Veenendaal and near Salins d'Hyères by the author are described in table 2. It is shown that the propodeum of the wasps in the former area is significantly more yellow than of wasps collected in 1975 in Hérault ( $P < 0.005$ ). The differences found in the colouration of the first gastral tergite were not significant.

In agreement with Van der Vecht & Van Breugel (1968) and Leclercq & Claparède (1978) it must be said that it will be of interest to determine to what degree the variation in colour patterns may develop in the coming years.

#### Position of the nests

At the end of the last century Peckham & Peckham (1898) studied 573 nests of what they called *Pelopeus* wasps and found that 546 of these nests were placed vertically and only 27 horizontally, usually under the roof of a house, or in any other sheltered place. Girault (Poorfellow, 1916) criticized the observations of the Peckhams, because they did not make distinction between *Sceliphron caementarium* and *Chalibion caeruleum* L. However, the Peckhams did not know that *C. caeruleum* used nests of *S. caementarium*. Therefore all the nests may have been built by the latter species. Yet the observation of the Peckhams remained subject to discussion, since Poorfellow (1916) found 919 out of 919 nests being built horizontally, with a slight inclination to the vertical, and Rau (1928) also have found merely horizontally built nests. Now, more than half a century later, Leclercq & Claparède (1978) found 32 nests, all of which being vertically orientated and during the present study two horizontal nests have been observed. The contradiction may be explained by assuming that the nesting sites were completely different: on walls and under stones, but the observation of the Peckhams remains unexplained. If differences in nesting sites and nest position may be another expression of geographical variation, it might be useful to study them more carefully, in order to see, together with the colour patterns, whether or not the wasps in Var and Hérault may have immigrated multifocally.

#### Mating in captivity

Two nests consisting of 4 and 6 cells respectively (figs 2a, b, c) were kept in a small cage (18 × 26 × 30 cm) with three sides covered with copper gauze. The wasps came out during the last week of July by removing the cap of their cells with their mandibles (figs 2 b, c). The first wasps that appeared were males, which paid full attention to both nests as long as females were inside. Directly after eclosion of a female, a couple, a triplet or a quadruplet was formed, consisting of one female with one (fig. 2e) or two (fig. 2d) or three males (fig. 2f). The act started like a fight at the bottom of the cage, during which the first male may copulate quickly with the female. The latter bent her gaster towards that of the male (fig. 2d). During the hours that followed, the couple, the triplet, or the quadruplet was maintained, even during flight or food intake (fig. 2e). For the subsequent weeks, during which the wasps were fed with honey and water, the females were neither interested in spiders nor did they build a nest. The females made some balls of clay which were put down on the bottom of the cage.

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BIOLOGY OF CHRYSOPIDAE, 1984. M. Canard, Y. Séméria & T.R. New eds; pp. X, 294; 108 figs, 25 tabs, ca. 670 refs, taxonomic index (Neuroptera) 12 kolommen, taxonomic index (non-Neuroptera) 9 kolommen, authors index 10 kolommen. *Series Entomologica* 27. Dr. W. Junk, Den Haag, ISBN 90-6193-137-1. Prijs (gebonden) f 150,—.

Sinds het geloof in de alleen-zaligmakendheid van insecticiden is verflauwd, en de rol die natuurlijke predatoren in cultures kunnen spelen meer wordt onderkend, is de belangstelling voor gaasvliegen niet meer louter platonisch. Toch zijn gaasvliegen, en Neuroptera in het algemeen, ook vanuit algemeen biologisch oogpunt insekten die meer aandacht verdienen dan ze veelal krijgen.

Dit boek is een geslaagde poging om de vloed aan nieuwe informatie te bundelen die er in de laatste twintig jaren over gaasvliegen beschikbaar is gekomen, en die verspreid is over een enorme scala tijdschriftpublicaties. Het boek onderscheidt zich van andere collectieve uitgaven doordat het geen losse verzameling artikelen is; de editors zijn er op bewonderenswaardige wijze in geslaagd om van de tekst typografisch en organisatorisch één geheel te maken. De technische verzorging van het boek is uitstekend.

Men heeft niet geprobeerd alles wat er over Chrysopidae te zeggen was op papier te zetten, maar heeft gekozen voor een paar min of meer inleidende hoofdstukken, waarna speciaal die onderwerpen worden belicht die thans in de actieve belangstelling staan. Dat levert dan de volgende acht hoofdstukken op: Paleontologie en evolutie, Morfologie en anatomie (van larven en imagines), Taxonomische problemen (karyotypie, electroforetisch werk), Ontwikkeling en gedrag (o.m. predatie, en een heel mooi stuk over geluidswaarneming en vluchtreacties op vleermuis-geluiden), Habitat en fenologie, Natuurlijke vijanden, Verzameltechnieken, en de Rol van deze insekten bij biologische en geïntegreerde bestrijding (massakweek, toepasbaarheid in kassen en in het veld, en in combinatie met insecticiden). — W. N. Ellis.