THE DEFENSIVE GLAND OF OMALIINAE (COLEOPTERA: STAPHYLINIDAE)

I. Gross Morphology of the Gland and Identification of the Scent of *Eusphalerum longipenne* Erichson

R. KLINGER and U. MASCHWITZ

Fachbereich Biologie-Ökologie der J.W.-Goethe-Universität Frankfurt am Main Siesmayerstrasse 70 6000 Frankfurt am Main, West Germany

(Received October 18, 1976; revised November 30, 1976)

Abstract—A description is given of the abdominal defensive gland of *Eusphalerum longipenne* Erichson. Through the aid of GLC and TLC, the two major compounds of its secretion are identified as 3-methylbutyric acid and *trans*-hex-2-enal.

Key Words—*Eusphalerum longipenne*, Staphylinidae, abdominal defensive gland, gross morphology, 3-methylbutyric acid, *trans*-hex-2-enal.

INTRODUCTION

When disturbed, many staphylinid beetles are known to release a secretion from their posterior. The secretion is produced and stored in certain glands, which are usually situated dorsally near the tip of the beetle's abdomen. There are several different types of glands, which cannot be regarded as homologous (Dierckx, 1899, 1901; Berger, 1968; Jenkins, 1957; Happ and Happ, 1973; Araújo, 1973; Jordan, 1913; Pasteels 1968a, 1968b).

The glands contain quite a variety of compounds including quinones, lactones, amines, ketones, aldehydes, alkanes, and alkenes (Wheeler et al., 1972; Blum et al., 1971; Brand et al., 1973; Berger, 1968; Schildknecht et al.,...
Considering the few known details, we have started a comparative study of the scent organs of Staphylinidae. We report here the chemistry and morphology of a new type of gland in *Eusphalerum longipenne* Erichson (Coleoptera: Staphylinidae) which to our knowledge has not been reported before.

**METHODS AND MATERIALS**

The beetles can be found in great numbers in the blossoms of various plants, where they feed on pollen and nectar. Specimens were collected from blossoms of *Ranunculus* sp. (Ranunculaceae) around Frankfurt in early spring.

To study the glands in situ the beetles were dropped into a mixture of hydrogen peroxide and potassium hydroxide, following the method of Blackwelder (1936).

Scanning electron microscopy was done on specimens, whose eighth sternite was dissected to study the cranial margin. Observations were done on a Cambridge Stereoscan 600.1 Whole beetles of both sexes were extracted with diethyl ether or with formic acid or a mixture of both (1:10).

The secretion was analyzed by GLC on a Perkin-Elmer 900 gas chromatograph isothermally with three different columns: (1) 4% Carbowax 1500 on Chromosorb G AW-DMCS 80–100 mesh; (2) 25% diethylhexyl sebacate and sebacic acid on silica gel 60–100 mesh; (3) 2.5% Carbowax 20 M on Chromosorb G AW-DMCS 80–100 mesh. For temperatures, see the Results section. All columns were metal, 180 cm × 2.7 mm. A nitrogen flow of 40–50 ml/min was employed.

TLC of 2,4-dinitrophenylhydrazones was carried out on silica gel. The plates were developed with petroleum ether (Urbach, 1963).

**RESULTS**

*Gross Morphology*

When handling the beetles, we always noticed an intense odor similar to fatty acids and aldehydes. The odorous secretion originates from a gland that occurs in both sexes, situated above the seventh and sixth sternite.

1 We are grateful to Dr. Grashoff, Senckenbergische Naturforschende Gesellschaft, Frankfurt, for having given us the possibility of working with the scanning electron microscope.