



## New data on the evaporarium of the thoraco-abdominal gland in the family Tingidae *sensu* Carayon 1962 (Hemiptera: Heteroptera: Tingioidea)

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The dorsolateral glands at the thoraco-abdominal junction in the Tingidae *sensu* Carayon 1962 (i.e., excluding Vianaididae) were described by Carayon (1962), who suggested that they are homologous to Brindley's glands (known only in Reduvioidea and functioning as specific scent glands). The glands described by Carayon (1962) in Tingidae occur in both sexes and consist of two parts, i.e., a true gland composed of glandular cellulae, and the so-called 'evaporarium,' composed of more or less rounded alveolae; both parts are connected by several canaliculi. The function of the glands is completely unknown or even hypothesized; and they have never been used for classification (except by Carayon [1962], who excluded Vianaididae from Tingidae partly based on this character) or in phylogenetic analyses.

The evaporarium itself is a paired structure on the inner surface of the first abdominal tergum (see Péricart 1983); each one is placed anterolaterally in a shallow concavity and is concealed by infolded intersegmental membrane (the membrane between the thorax and the abdomen). The dorsal surface of each concavity is rather smooth or slightly rugulose, and bears several very small pores. The number of alveolae recorded by Carayon (1962) differs among taxa, i.e., from 15–20 in *Agramma* Stephens to more, arranged in 4–5 rows, in other taxa.

Carayon (1962) suggested that the dorsolateral glands in Tingidae (*sans* Vianaididae) evolved from typical Brindley's glands, and that their transformation has culminated in two different structures in Tingidae: (1) a small pocket with gland, but without evaporarium – in Cantacaderinae *sensu* Drake & Davis, 1960 [regrettably Carayon examined only a specimen of a single *Cantacader* sp. representing the tribe Cantacaderini *sensu* Drake & Davis, 1960; no species of Phatnomatini *sensu* Drake & Davis, 1960 was studied by him]; and (2) a well developed evaporarium—in Tinginae *sensu* Drake & Davis, 1960.

Similar glands have not been found in any other cimicomorphan taxa (B. Lis unpublished). Because no-one has studied this structure in the Phatnomatini *sensu* Drake & Davis, 1960 (Phatnomatinae *sensu* B. Lis, 1999), I carried out such a study and compared its evaporarium to the two conditions recognized by Carayon (1962).

The aim of this paper is to show differences in the evaporarium of the taxa within the family Tingidae, rather than to discuss the phylogenetic relationships between this family and others.

**Material and methods.** This study was based on material representing three suprageneric taxa of Tingioidea, namely (1) the Phatnomatini *sensu* Drake & Davis, 1960 (Phatnomatinae *sensu* B. Lis, 1999); (2) the Tinginae *sensu* Drake & Ruhoff, 1965 (Tingini and Ypsotingini); and (3) the Cantacaderini *sensu* Drake & Davis, 1960 (Cantacaderidae *sensu* B. Lis, 1999). Most of the specimens came from the author's collection (DBUO), and some from the following institutions: Bernice P. Bishop Museum, Honolulu, Hawaii, USA (BMH); Hungarian Natural History Museum, Budapest, Hungary (HNHM); Muséum National d'Histoire Naturelle, Paris, France (MNHN); Zoologisches Museum, Humboldt Universität, Berlin, Germany (ZMB).

*A list of studied taxa:* (1): *Cnemiandrus typicus* Distant, 1902 [Republic of South Africa] (BMH), *Microcader thai* Péricart, 1991 [Thailand] (HNHM), *Plesionoma capeneri* Duarte-Rodrigues, 1981 [Republic of South Africa] (ZMB), *Ulmus testudineatus* Distant, 1904 [Republic of South Africa] (HNHM); (2): *A. musci* (Schränk, 1781) [Poland], *A. parvula* (Fallén, 1807) [Poland], *Corythaica cyathicollis* (Costa, 1864) [USA], *Derephysia foliacea* (Fallén, 1807) [Poland], *Dictyla humuli* (Fabricius, 1794) [Poland], *Phaenotropis cleopatra* (Horváth, 1905) [India] (DBUO), *Tingis ampliata* (Herrich-Schaeffer, 1838) [Poland], *T. cardui* (Linnaeus, 1758) [Poland] (all DBUO); (3): *Allocader cordatus* (Hacker, 1927) [Australia] (HNHM), *Cantacader tenuipes* Stål, 1865 [Ghana] (MNHN), *Carldrakeana socia* (Drake & Ruhoff, 1961) [Australia] (HNHM).

*Laboratory methods.* During the study, fresh and dried specimens were investigated (dried specimens were soaked in warm water). The abdomen was pulled out, and abdominal terga I–II separated from it. Then the evaporarium was partially separated from tergum I, and both, terga and evaporarium were put on a slide in a drop of paraffinic liquid in the