UPPER OLIGOCENE FOSSIL PUPAE AND LARVAE OF *CHAOBORUS TERTIARIUS* (VON HEYDEN) (CHAOBORIDAE, DIPTERA) FROM WEST GERMANY

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A redescription of Upper Oligocene fossil pupae of Chaoborus tertiarius *(von Heyden) and description of newly discovered fossil larval fragments suggests that speciation which led to ancestors of the sister subgenera,* Chaoborus s. str. *and* Schadonophasma *occurred 25 million years ago. Fossil larval mandibles may have come from a population ancestral to, or of, a sister species of* C. flavicans *within* Chaoborus s. str.

Une redescription des pupes fossiles de Chaoborus tertiarius *(von Heyden) datant de l'Oligocène supérieur et une description de fragments de larves récemment découverts suggèrent que le processus de spéciation qui a donné naissance aux ancêtres des sous-genres "seours"* Chaoborus s. str. *et* Schadonophasma *s'est produit il y a 25 millions d'années. Les mandibules des larves fossiles pourraient provenir d'une population ancestrale à, ou d'une espèce soeur de* C. flavicans *appartenant aux* Chaoborus s. str.

Fossils may provide data which permit testing of phylogenetic inferences based on less direct criteria. In addition, fossils exhibiting apomorphies that are used in determination of phyletic relationships of extant species, provide minimum ages for speciation events. During a systematic study of the species of the subgenus *Schadonophasma* Dyar and Shannon (Borkent, in press), I surveyed the literature for previous descriptions of fossils which may provide phylogenetic clues. Figures of fossil *Chaoborus* pupae by von Heyden (1862) exhibited one of the synapomorphies used to group the subgenera *Chaoborus s. str.* and *Schadonophasma.* I therefore undertook a study of the original material and I describe it more fully below. In addition, larval fragments were discovered which are also described. These results suggest that examination of other fossil chaoborid material (Edwards, 1923; Hennig, 1966; Hope, 1847; Loew, 1850, 1861; Meunier, 1902, 1904; Scudder, 1890 (questionable identification); Serres, 1829: 268), generally inadequately described, may be of use in providing information on the phylogeny of chaoborid species.

METHODS

The fossils were moistened with xylene and examined under both stereoscopic and compound microscopes. Larval fragments could only be seen when wet. Drawings were made by means of a drawing tube and, unless otherwise stated, scales on the figures represent one millimeter.

Chaoborus tertiarius (von Heyden)

Culcites tertiarius von Heyden 1862: 79. Two complete pupae, a series of disarticulated pupal parts, larval mandibles and anal fans on two pieces of brown paper coal. LECTOTYPE HERE DESIGNATED as complete male pupa (von Heyden 1862: Fig. 30). Labelled 'In 38802' '58787', 'Culicites tertiarius v. Heyden "abgebildetes originalex" Pal. XXXf. 30–35'. Upper Oligocene brown paper coal from Rott, Siebenbirge, West Germany. Material deposited in

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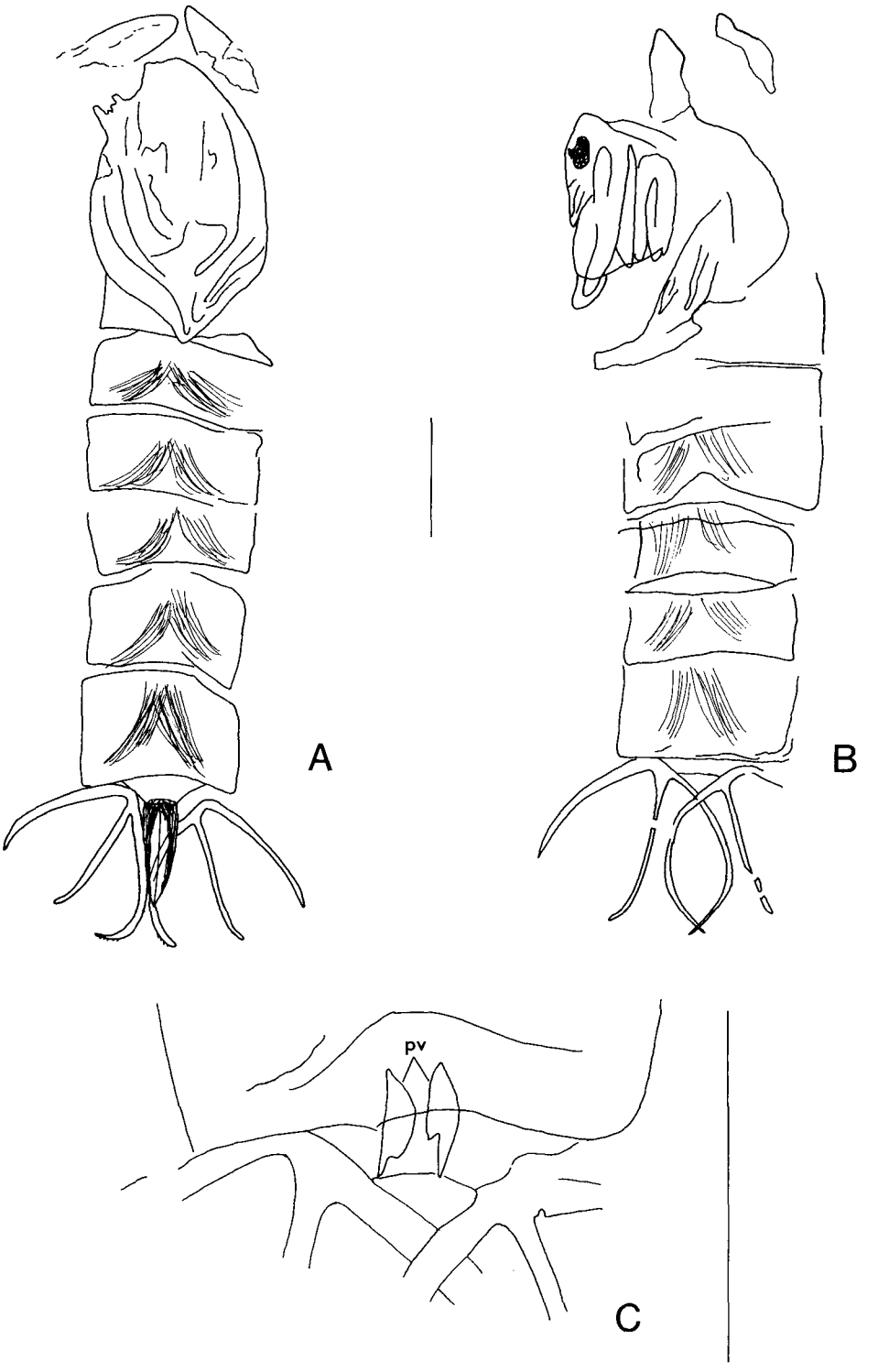

Fig. 1. Pupae of *Chaoborus tertiarius*. A. Lectotype, ventral aspect. B. Paralectotype, thorax in lateral aspect, abdomen in ventral aspect. C. Paralectotype, terminalia (pv = penis valves).

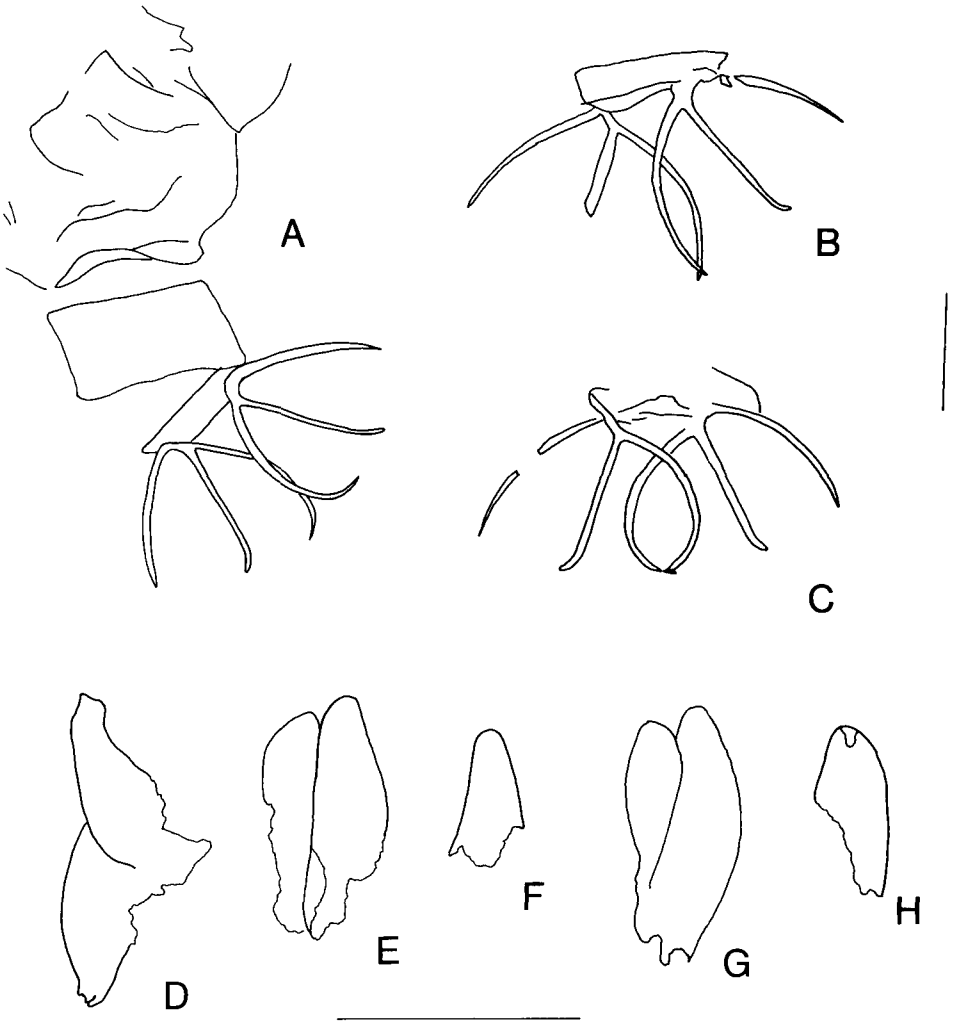

Fig. 2. Pupal paralectotypes. A–C. Paddles. D–H. Repiratory horns.

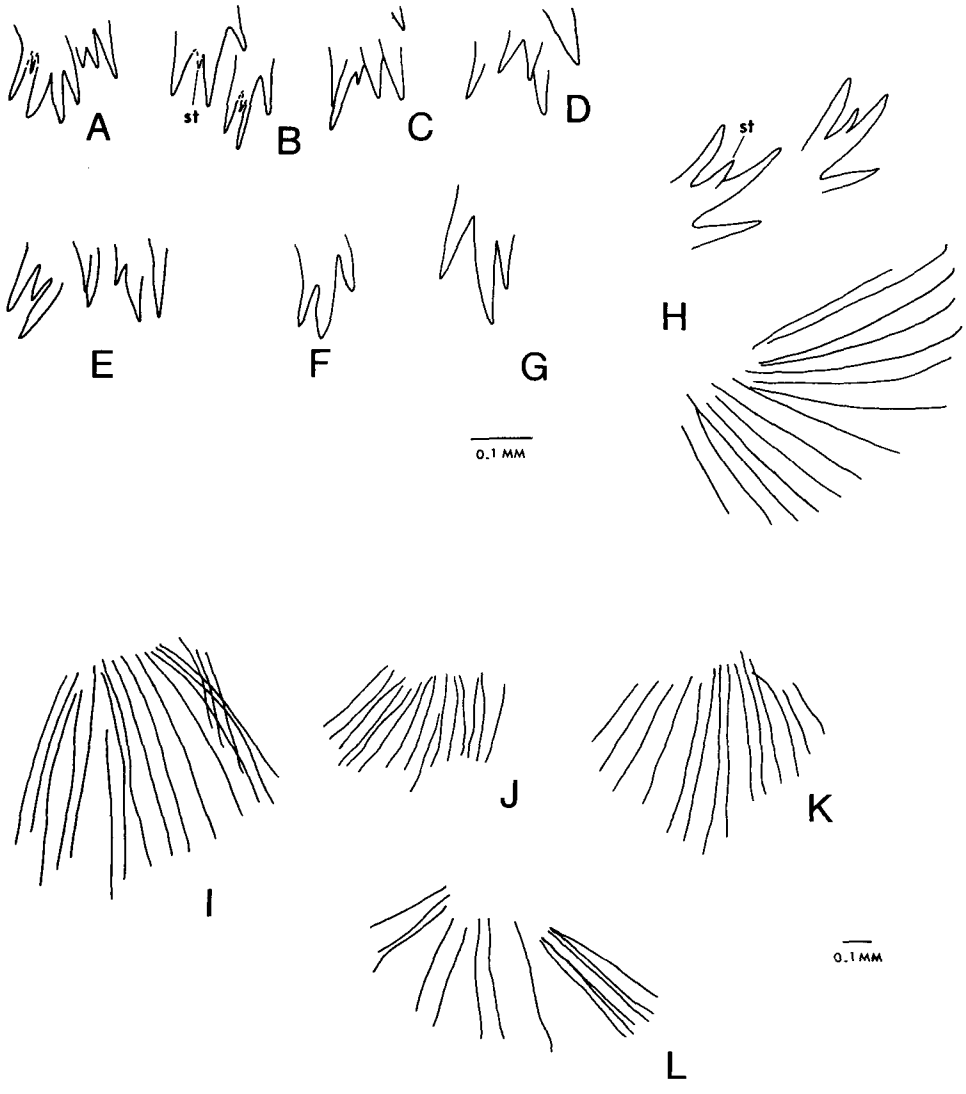

Fig. 3. Larval paralectotypes. A–H. Mandibles, H with mandibular fan. I–L. Anal fans. (st=subordinate tooth).

The concentration of fossils on two pieces of paper coal additionally suggests that the lake supported a large population of *Chaoborus tertiarius* although, as Statz (1944) discussed, it is puzzling why additional material has not been discovered.

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