*Lauterbornia* 67: 29-37, D-86424 Dinkelscherben, 2009-08-17

# The larvae of *Graceus ambiguus* and *Sergentia* near *prima* and their identification

Hub Cuppen, Alexander Klink and Henk Moller Pillot

With 9 figures

**Keywords**: Graecus, Sergentia, Chironomidae, Diptera, Insecta, Netherlands, morphology, identification, ecology
**Schlagwörter**: Graecus, Sergentia, Chironomidae, Diptera, Insecta, Niederlande, Morphologie, Bestimmung, Ökologie

**The larvae of *Graceus ambiguus* and *Sergentia* near *prima* are described and a key is presented to separate these larvae from related genera and species**

## 1 Introduction

Identification of Chironomini larvae with the inner pair of median mental teeth lower than the outer pair has always given difficulties and in our collections we had several larvae not well fitting in the keys (e.g. Pinder & Reiss 1983, Moller Pillot 1984). Last year we could solve some of the problems because two such larvae could be identified.

The first author collected many larvae and pupae of *Graceus ambiguus* Goetghebuer, 1928 in Punthuizerven, a small moorland pool in the province of Overijssel (The Netherlands). *Sergentia* near *prima* has been collected by the second author; he found 18 larvae, 2 praepupae and 6 pupae in Zuiderafwateringskanaal near Raamsdonkveer (The Netherlands). These pupae could not be separated from those of *Sergentia prima* Proviz & Proviz, 1997 (P. Langton in litt.), although the larvae were quite aberrant from those of *S. prima* as described and figured by Proviz & Proviz (1997).

### 2 Material examined

*Graceus ambiguus*
De Lutte, The Netherlands, Punthuizerven 269.17/485.92 (leg. B. Knol 20.4.05, coll. Regge & Dinkel, coll. H. Cuppen, coll. H. Moller Pillot): 163 larvae, 30 pupae.
De Lutte, The Netherlands, Brecklenkampse Veld 265.16/495.71 (leg. H. Cuppen 20.4.05, coll. Regge en Dinkel): 2 larvae.

*Sergentia* **near** *prima*
Raamsdonkveer The Netherlands Zuiderafwateringskanaal, 121.69/413.75, (leg. A. Klink 8.5.06): 6 pupae, 2 prepupae, 18 larvae.

Albergen, The Netherlands, canal Almelo-Nordhorn, 249.83/487.28 (leg. H. Cuppen 18.5.04, coll. nr.21001): 3 larvae.
Oostendorp, The Netherlands, Puttenerbeek (leg. J. Mulder 8.4.05) 1 larva.
Hlupin, Belarus, Lake Karasino 52°04' N, 28°12' E (leg. H. Moller Pillot 25.7.02, coll. nr. 42550): 2 larvae.

## 3 *Graceus ambiguus*

According to Cranston e.a. (1989) the genus *Graceus* is related to the North American genus *Hyporhygma* and the Holarctic genus *Tribelos*. On the basis of the female genitalia Saether (1977) placed the genus close to *Phaenopsectra* (incl. *Sergentia*). At first glance the larva is very similar to *Endochironomus*. The frontal apotome is separated from the clypeus by a fine suture (Fig. 1) and the lower eye is subdivided in a large posterior and a smaller anterior section (Fig. 2). *Graceus* can be separated from *Endochironomus* by a head length not exceeding 0,5 mm in the final stage (*Endochironomus* 0,7-0,9 mm) and the triangular ventromental plates with teeth within the outer rim (Fig. 3), where *Endochironomus* may posses a serrated outer rim. Related genera *Phaenopsectra, Sergentia* and *Tribelos* do not posses a clypeus. The latter one stands out also with its dark gula.

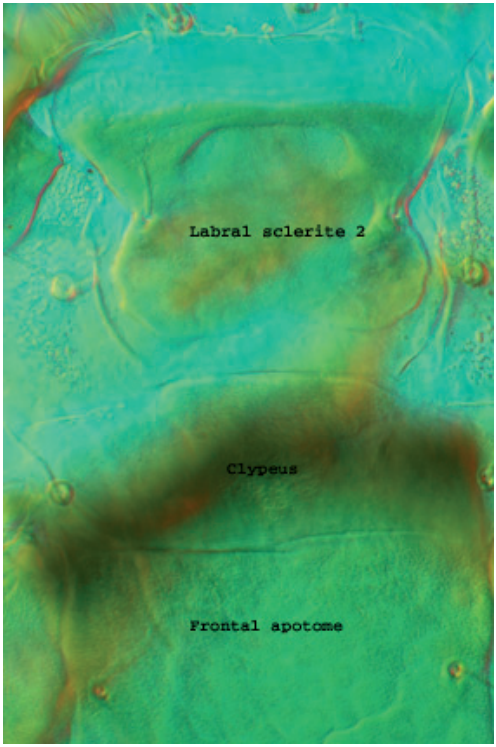


**Fig. 1: *Graceus ambiguus*. Dorsal part of head capsule**

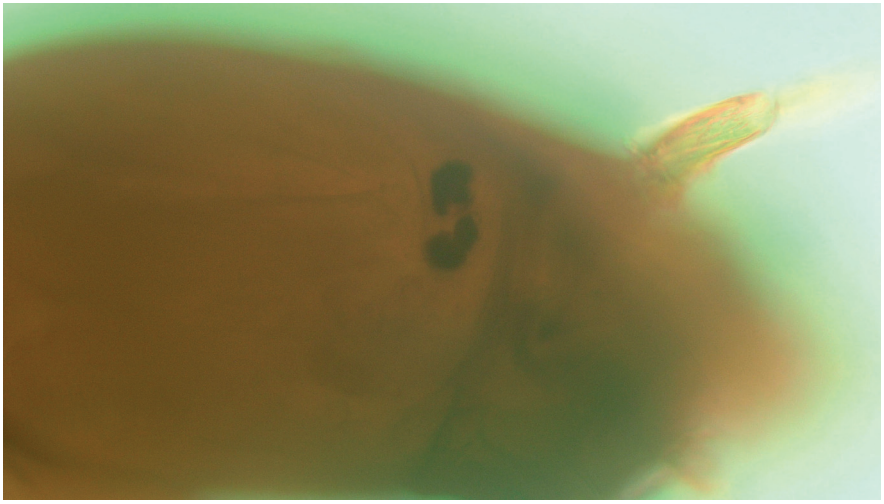

**Fig. 2: *Graceus ambiguus*. Lateral part of head capsule**

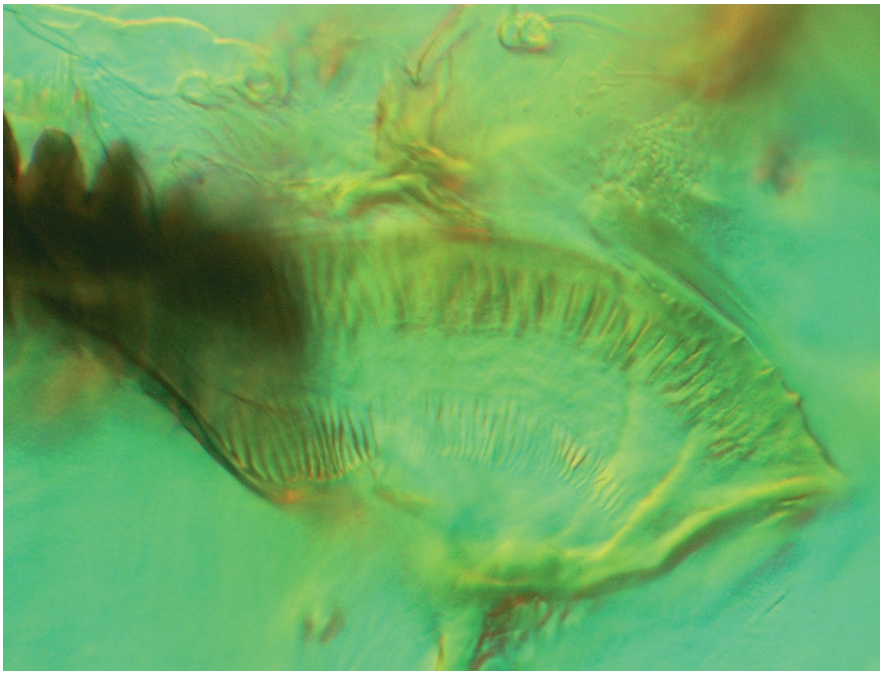

***Fig.3: Graceus ambiguus.* Ventromental plate**

The genus *Sergentia* is very close to *Phaenopsectra*. Adult males and females and pupae differ only in few characters. However the species found in the Netherlands differs in some aspects from *S. prima.*

The larvae has a mandible with only three inner teeth (four in *S. prima*). The gula is yellow instead of dark brown. The pupa is considerably smaller (4,3-5 mm) than *S prima* (6,4-7,8) and the number of taeniae on the anal lobes (27) is far less than the 59 (45-68) in *S. prima*. The male hypopygium seems identical to that of *Phaenopsectra flavipes* (Langton and Pinder 2007, Fig. 226A) and is characterized by a slender gradually tapering gonostylus with a small group of apical setae. The superior volsella has a long lateral seta and the antepronotum is reduced.

The larva is characterised by its large eyes (Fig. 4), constricted anal tubules (Fig. 5) and mandible without basal nodge and with a yellow dorsal tooth (Fig. 6) in combination with the mentum and submental plate with laterally diminishing striae in the median part only (Fig. 7). The head capsule is smooth as in *Tribelos* and *Graceus*. The head length (0,35-0,4 mm) is however smaller (0,45-0,5 in both other genera). The second antennal segment of *Graceus* is short and about as long as third segment and not more than 0.25 of first segment. Sergentia near prima has a longer second antennal segment that is about twice the length of third segment and one third of first segment.

The differences between *Sergentia* near *prima* and *Graceus ambiguus* and related genera are given in the key below.

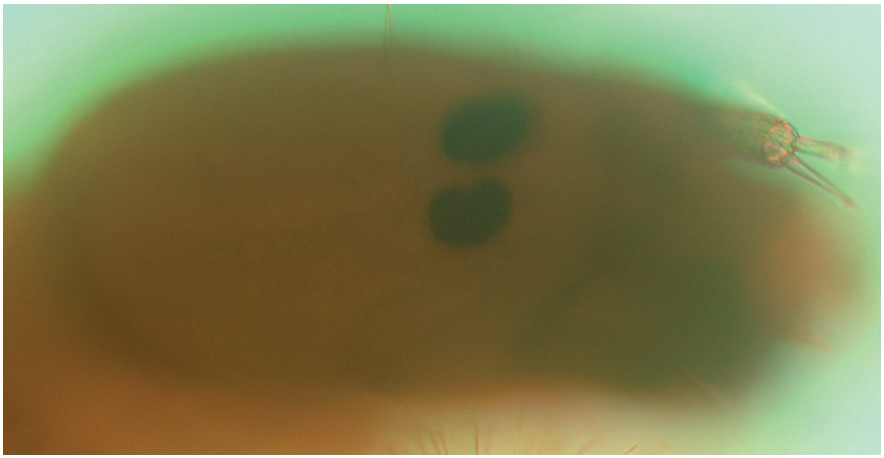

**Fig. 4: *Sergentia* near *prima*. Lateral part of head capsule**

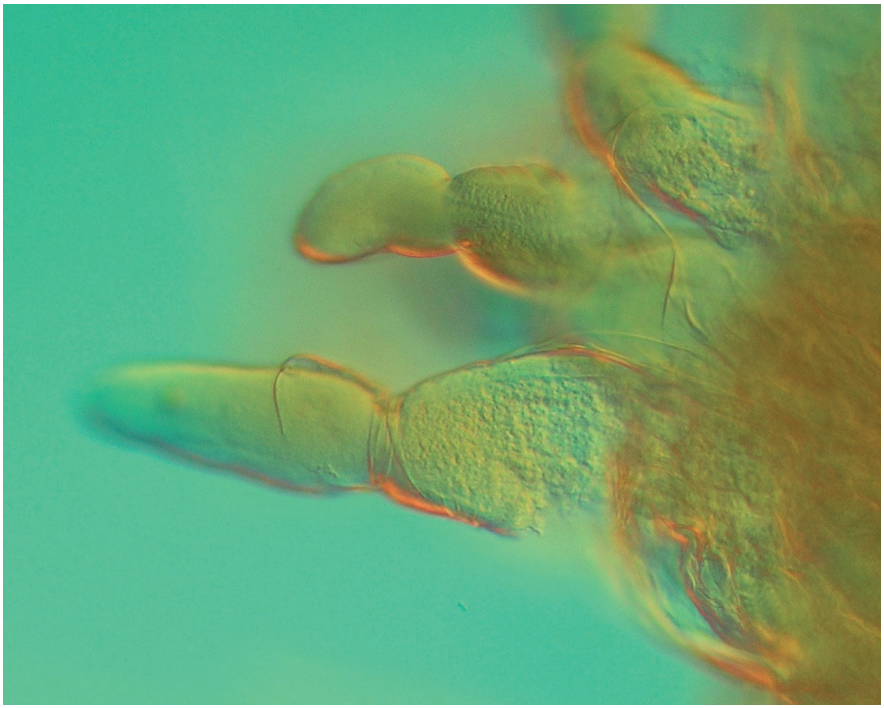

**Fig. 5: *Sergentia* near *prima.* Anal tubules**

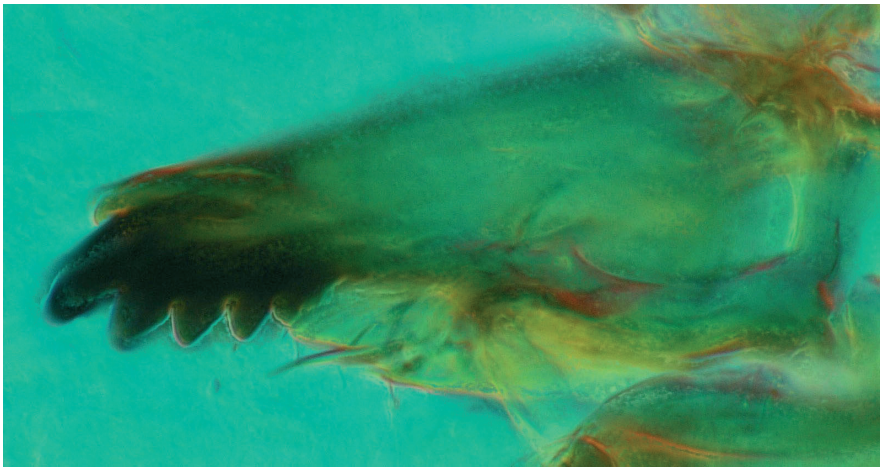

**Fig. 6: *Sergentia* near *prima.* Mandible**

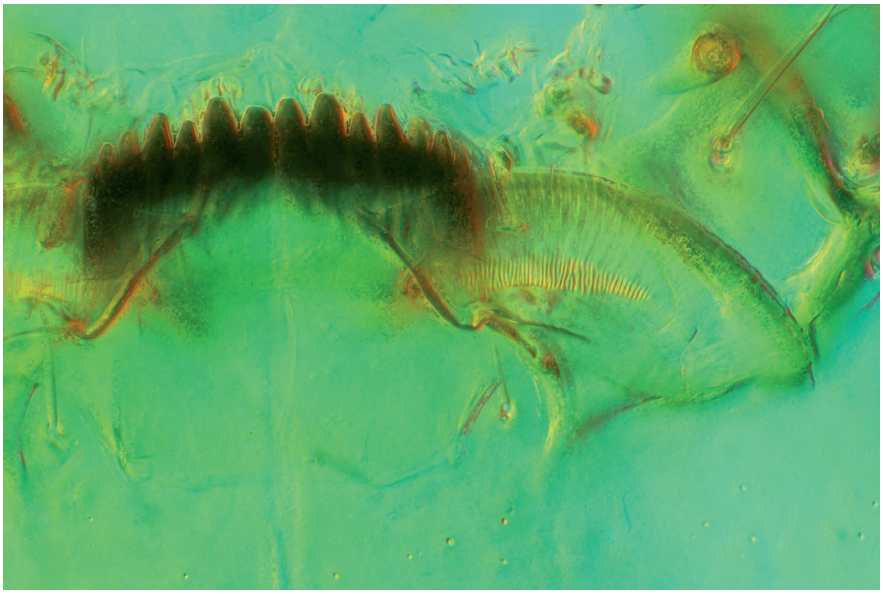

**Fig. 7: *Sergentia* near *prima*. Mentum and submental plate**

## 5 Key to the final stage larvae

The larvae with the inner pair of median mental teeth lower than outer pair can be identified as follows:

**1a** Antenna 6 segmented — ***Stictochironomus, Omisus***
**1b** Antenna 5 segmented — **2**

**2a** Clypeus separated from frontal apotome by narrow suture (Fig. 1) and lower eye subdivided in a large posterior and small anterior part — **3**
**2b** Clypeus absent and lower eye at the most kidney shaped — **4**

**3a** Head capsule smooth at most 0,5 mm long, ventromental plates triangular with smooth outer border and teeth within the outer rim (Fig. 3). S1 plumose dorsally and ventrally (Fig. 8) — ***Graceus ambiguus***
**3b** Head capsule grained at least 0,7 mm long, Ventromental plates wider and/or with serrated or coarsely toothed outer rim. S1 only plumose ventrally (as in Pinder and Reiss, 1983: Fig 10.24G — ***Endochironomus***

**4a** Labral sclerite 1 present (Pinder and Reiss, 1983: Fig. 10.78E. Gula dark with a white median stripe (Fig. 9) — ***Tribelos intextus***

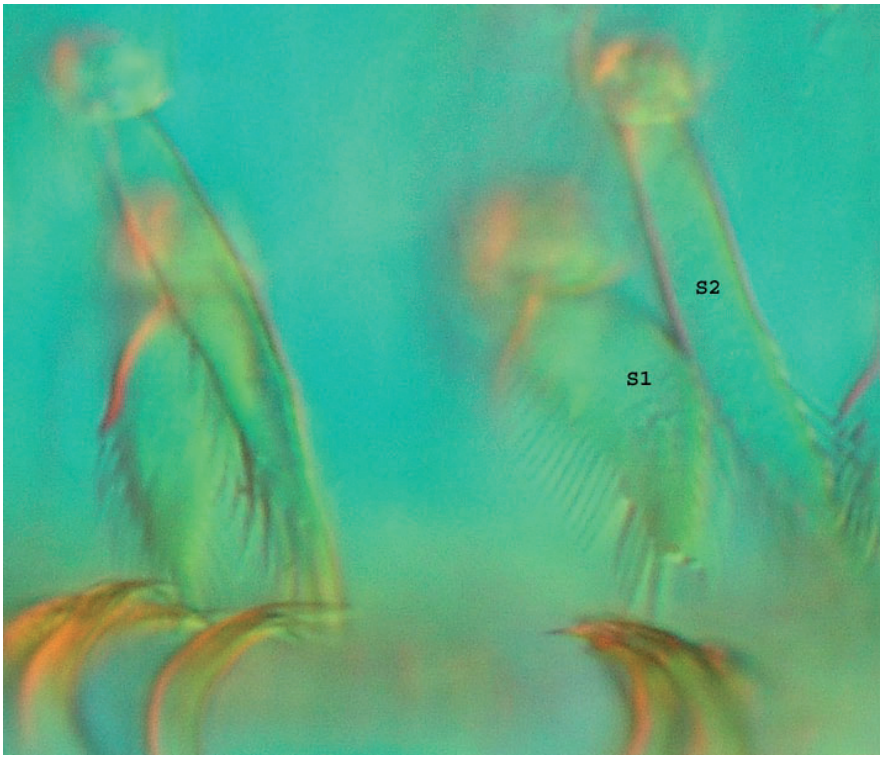


**Fig. 8:** ***Graceus ambiguus.*** **Labrum with S1 and S2**

**4b** Labral sclerite 1 absent (Pinder and Reiss, 1983: Fig. 10.58G. Gula yellow **5**

**5a** Mandible with four inner teeth. Gula with or without dark brown patch ***Sergentia*** **p.p.**

Further identification is possible with Wülker et al. (1999)

**5b** Mandible with three inner teeth. Gula yellow **6**

**6a** Mandible with a deep notch before basal tooth (Pinder and Reiss, 1983: Fig. 10.58D). Dorsal tooth mandible black. Head capsule orange-yellow and finely grained ***Phaenopsectra flavipes***

**6b** Mandible without a deep notch before basal tooth. Dorsal tooth mandible yellow and headcapsule yellow and smooth ***Sergentia*** **near** ***prima***

**Fig. 9: *Tribelos intextus.* Ventral part of head capsule**

## 6 Ecology

Both sites where Graceus ambiguus has been collected in the Netherlands were mesotrophic depressions in wet nutrient poor grassland and wet heathland. Both sites dry up during summer. Cranston et al. (1989) mention that adults have been collected beside shallow sandy heathland pools.
Sergentia near prima has been found in the Netherlands in two canals, a canalized stream and a floodplain lake.

## References

Cranston, P. S., M.E. Dillon, L .C. V. Pinder & F. Reiss (1989): The adult males of Chironominae (Diptera: Chironominae) of the Holarctic region. Keys and diagnoses.– Entomologica Scandinavica Supplementum 34: 353-502, Copenhagen

Langton, P. H. & L. C. V. Pinder (2007): Keys to the adult male Chironomidae of Britain and Ireland.- Freshwater Biological association Scientific Publication 64:,239 pp.+ app.

Pinder, L. C. V. & F. Reiss, 1983. The larvae of Chironominae (Diptera: Chironomidae) of the Holarctic region. Keys and diagnoses.– In: Wiederholm, T. (ed.): Chironomidae of the Holarctic region. Keys and diagnoses. Part 1. Larvae.– Entomologica Scandinavica Supplementum 19: 293-435, Copenhagen

Proviz, V.J. & L.I. Proviz, 1997. A new chironomid species of the genus Sergentia (Diptera, Chironomidae) from the Irkutsk water reservoir.- Zoologicheskii zhurnal 76: 633-636, Moskwa (in Russian)

Saether, O.A., 1977. Female genitalia in Chironomidae and other Nematocera: morphology, phylogenies, keys. – Bulletin of the Fisheries Research Board of Canada 197, 209 pp., Ottawa

Wülker, W., I.I. Kiknadze, I.E. Kerkis & P. Nevers, 1999. Chromosomes, morphology, ecology and distribution of Sergentia baueri, spec. nov., S. prima Proviz & Proviz, 1997 and S. coracina Zett., 1824 (Insecta, Diptera, Chironomidae). – Spixiana 22: 69-81, München

*Adress of the authors*: Drs Hub Cuppen, Hogeweg 8, NL-6961 LT Eerbeek
Dipl. Ing. Alexander Klink, Boterstraat 28, NL-6701 CW Wageningen
Dr. Henk Moller Pillot Leyparkweg 37, NL-5022 AA Tilburg

*Received and accepted*: 2009-05-27