

Lasiodiamesa gracilis (Chironomidae: Podonominae) new for the Dutch fauna

Wilco C.E.P. Verberk¹
Gert-Jan A. van Duinen¹
Henk K.M. Moller Pillot²
Hans Esselink¹

¹ Bargerveen Foundation
Faculty of Science, Mathematics and
Computing Science, University of Nijmegen
(KUN)
Postbus 9010, 6500 GL Nijmegen
wilcov@sci.kun.nl
² Leyparkweg 37
5022 AA TILBURG

Summary

Lasiodiamesa gracilis is recorded for the first time from The Netherlands. During a research program aimed at evaluating the effects of restoration measures, larvae have been collected in Korenburgerveen and Wooldse Veen. Both reserves are located in Gelderland. After rearing several larvae to adulthood, adult males were identified as *Lasiodiamesa gracilis*. Distinguishing characters for larvae are given, as well as structural differences in the male genitalia. In addition, attention is paid to the ecology and geographical distribution. The populations at Korenburgerveen and Wooldse Veen are probably glacial relicts, which have remained after the ice-sheet retreated at the end of the Würm-glaciation.

Keywords: fauna nova species, The Netherlands

Introduction

During a research program aimed at evaluating the effects of restoration measures, samples of aquatic invertebrates have been collected. During field visits in 1999, 2000 and 2002 more than 100 larvae (in 30 bog puddles) of the genus *Lasiodiamesa* (Chironomidae: Podonominae) were found in the bog remnants Korenburgerveen and Wooldse Veen (both in the province Gelderland). This genus is very rare in The Netherlands; in fact only one find spot is known from the raised bog remnant Mariapeel. The larvae cannot be identified to species level. After about 25 larvae to adulthood, all adult males were identified as *Lasiodiamesa gracilis* (Kieffer) using Brundin (1966). To ensure correct identification, specimens were checked and their identity was confirmed by the chironomid specialist P.H. Langton. This species is recorded for the first time in The Netherlands.

Korenburgerveen is a nature reserve located northeast of Winterswijk and has many different biotopes (e.g. raised bog, heathland and alder swamp) and is well-known for its high species diversity. Currently restoration measures are taken focussing on restoration of the raised bog part by retaining rainwater and limiting inflow of nutrient-rich water from adjacent agricultural areas. Wooldse Veen is located south of Winterswijk and is less heterogeneous. Here also restoration measures are being planned, focussing on restoration of the raised bog part.

Figure 1.
Larva of *Lasiodiamesa* sp.
Photo: René Krekels.



Identification

The larvae of the genus *Lasiodiamesa* are easily distinguished from other Chironomidae larvae. They have a purple colour and the segments are clearly delineated (figure 1). The procerci (brush pedestals) on the anal segment are elongated (8-10 times as high as wide) and the brush consists of about 13 fairly short setae. Other abdominal setae are poorly developed. Other characteristics include a labium with one large middle tooth and 12 pairs of lateral teeth and a ringed third antennal segment (Brundin 1966).

Only adult males can be identified to species level. Discriminating characteristics between the species are located in the hypopygium. Tergite IX has a short, blunt-tipped anal point, carrying two lancet-shaped setae at the tip (figure 2). The apical portion of the parameres is very slender and S-shaped (figure 2). Dististyles are built compactly, their basal portion prolonged into a well-marked 'heel' (figure 2). For a more detailed overview on morphological characteristics in *Lasiodiamesa gracilis* and other species of *Lasiodiamesa* see Brundin (1966).

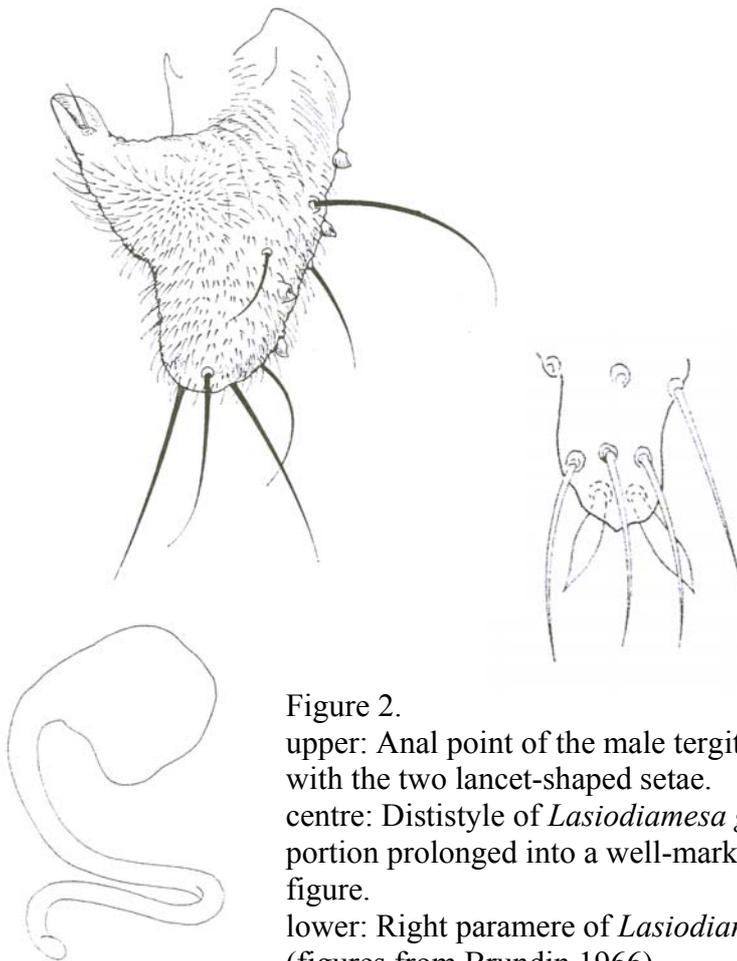


Figure 2.

upper: Anal point of the male tergite IX in *Lasiodiamesa gracilis* with the two lancet-shaped setae.

centre: Dististyle of *Lasiodiamesa gracilis* male with the basal portion prolonged into a well-marked 'heel' at the bottom of the figure.

lower: Right paramere of *Lasiodiamesa gracilis* (figures from Brundin 1966).

Ecology

Information on the biology of *Lasiodiamesa gracilis* is scarce. The genus stands out ecologically as a separate group. The larvae and pupae of *Lasiodiamesa* are well fitted for the life in standing waters. The pupae are especially adapted to effective swimming and resemble certain pupae among Tanypodinae and Culicidae. The larvae live preferably in bog-waters (Brundin 1966). This is in agreement with the find spots in Korenburgerveen and Wooldse Veen. Larvae were most abundant in shallow puddles, with a not too dense vegetation of *Sphagnum cuspidatum* and

Eriophorum vaginatum. Highest densities were recorded in a puddle at the transitions of vegetation and small-unvegetated spots.

In Estonian bog landscapes larvae of *Lasiodiamesa* sp. were found in the lagg zone of the bog landscape (Bargerveen foundation, unpublished data). Compared to the centre of the raised bog, the lagg zone is more influenced by minerotrophic water (i.e. ground or surface water which is rich in minerals). This is also in agreement with the larval habitat of *L. sphagnicola* on west Clara Bog as described by Ashe (1987): *Sphagnum* pools near birch (*Betula pubescens*) which are about 0.5-1 m long, 0.3 m wide, shallow and associated with a slight flush (i.e. surface water movement or trickles which may be minerotrophic). Minerotrophic environments have a higher alkalinity (the capacity to buffer against acids). Although the term does not refer directly to the nutrient levels of N and P, a higher alkalinity can increase the decomposition rate, resulting in a higher availability of nutrients in minerotrophic environments.

Digestive tract analysis on larvae (n=5) from different localities in Korenburgerveen (with high and low algal bloom and low algal bloom) revealed that gut contents consisted of algae only, with no sign of other microscopic animal life (e.g. rotifers, cladocerans), suggesting that the species feeds on algae, a likely available food source in slightly enriched bog pools.

Larvae were collected in spring, autumn and winter (February). In all cases the size of the larvae was ≥ 5 mm and the reared larvae readily became pupae. Brundin (1983) lists a size of 5-8 mm for fourth instars. From this information it can be concluded that most larvae were fourth instar. Pupae were found in late spring (until mid May, after which no larvae or pupae were found), but not in autumn. This suggests that the species is univoltine, with adults emerging in late spring and overwintering larvae. However, this cannot be stated with certainty, as relatively few field visits were undertaken in autumn and winter.

Geographical distribution

The genus *Lasiodiamesa* mainly occurs in the broad birch-coniferous belt of the Boreal zone. It is known from Fennoscandia, northern Russia, the Baltic states, Poland, Germany, the British Isles, Canada and the U.S.A. The southern occurrences in Central Europe seem to be confined to *Sphagnum* bogs. The southern disjunct populations are therefore assumed to be glacial relicts, which have remained after the ice-sheet retreated at the end of the Würm-glaciation (Brundin 1966).

Most of the above occurrences refer to *Lasiodiamesa sphagnicola*, which has its distribution in North and Central Europe, including Britain and Ireland (Ashe 1987). *Lasiodiamesa gracilis*, however, was known only from the north-eastern parts of Central Europe and from North Europe (Swedish Lapland, South Sweden and Southwest Poland). Therefore the recording of this species in The Netherlands is an extension of the known geographical distribution.

The new recording in The Netherlands is probably not the result of an expansion of the species distribution. One of the reasons why the species has not been recorded in The Netherlands before is because the habitat has been poorly studied. Nevertheless, samples in six other raised bog remnants throughout The Netherlands have yielded no new occurrences (Van Duinen et al. in press). Therefore, the late recording can also be attributed to the rareness of the species. Thus the species shows a highly fragmented distribution pattern, occupying a limited number of raised bog remnants, where it may be quite common locally. Relict populations are often very rare at the regional level and can be common at the local

level, supporting the idea that the populations of *Lasiodiamesa gracilis* are glacial relict populations (or metapopulation, if the population at Korenburgerveen and Wooldse Veen are considered subpopulations). This raises some questions: What is the history of Korenburgerveen and Wooldse Veen or what special environmental conditions are present enabling the populations to persist? What is the ecology (e.g. adult dispersion capability, larval habitat requirements) of *Lasiodiamesa gracilis*? What are the effects of the restoration measures on the environmental conditions and the persistence of *Lasiodiamesa gracilis*? These are questions we hope to deal with in a further study, which will focus more on the ecology and distribution of the species.

Acknowledgements

We wish to thank Han Duyverman from Vereniging Natuurmonumenten for information about Korenburgerveen and permission to enter the reserve and collect samples, Peter Langton (Huntington, UK) for checking the identifications of the adult males and Yan Zhuge and Esther Graaskamp for their help with digestive tract analysis. We also thank Herman de Jong for critically reviewing the manuscript.

References

- Ashe P 1987. *Lasiodiamesa sphagnicola*, *Cardiocladius capucinus* and *Orthocladius (Eudactylocladius) fuscimanus* (Diptera:Chironomidae) new to Ireland. The Irish Naturalists' Journal 22:194-195.
- Brundin L 1966. Transantarctic relationships and their significance, as evidenced by chironomid midges, with a monograph of the subfamilies Podonominae and Aphroteniinae and the austral Heptagytiae. Kungliga Svenska Vetenskapsakademiens Handlingar. Fjärde serien Bd. 11: 1-472.
- Brundin L 1983. 4. The larvae of Podonominae (Diptera: Chironomidae) of the Holarctic region - Keys and diagnoses. Entomologica Scandinavica Supplementum 19: 23-31.
- Van Duinen GA, Brock AMT, Kuper JT, Leuven RSEW, Peeters TMJ, Roelofs JGM, van der Velde G, Verberk WCEP & Esselink H in press. Do restoration measures rehabilitate fauna diversity in raised bogs? A comparative study on aquatic macroinvertebrates. Wetland Ecology and Management.

Samenvatting

***Lasiodiamesa gracilis* (Chironomidae: Podonominae), een nieuwe dansmug voor de Nederlandse fauna**

De dansmug *Lasiodiamesa gracilis* wordt voor het eerst uit Nederland gemeld. Tijdens bemonsteringen ten behoeve van een evaluatie van herstelmaatregelen is de soort aangetroffen in het Korenburgerveen en later eveneens in het Wooldse Veen. Beide gebieden liggen in de Achterhoek, Gelderland. Aangezien alleen de adulte mannetjes tot op soort gedetermineerd kunnen worden zijn enkele larven opgekweekt en bleek het om *Lasiodiamesa gracilis* te gaan. Determinatiekenmerken voor de larven en de adulte mannetjes, alsmede habitatomschrijving, ecologie en verspreiding van de soort worden besproken. Deze nieuwe vondst betekent een uitbreiding van het bekende verspreidingsgebied. Een van de redenen dat de soort niet eerder is gemeld uit Nederland is dat hoogveen niet uitvoerig is geïnventariseerd. Het verspreidingsbeeld van *Lasiodiamesa* geeft aan dat de soort nationaal zeer zeldzaam is, maar in het Korenburgerveen vrij algemeen voorkomt. Waarschijnlijk gaat het om relictpopulaties zijn die zijn achtergebleven na de Würm ijstijd.