Species of the subgenus Chaetolabis, Townes 1945 of the genus Chironomus, Meigen 1803 (Diptera: Chironomidae), from a cytogenetic perspective

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Abstract

The polytene chromosomes of three North American species in the subgenus Chaetolabis of the genus Chironomus are described and compared to the published karyotypes of two Palearctic species. Chironomus (Chaetolabis) atroviridis has four polytene chromosomes, like the Palearctic C. globulus, while C. ochreatus and the North American populations of C. bitumineus each have three chromosomes due to tandem fusion of arm G to arm E, as in the Palearctic populations of C. bitumineus. The results support the existence of distinct species, particularly clarifying that the names C. atroviridis, C. bitumineus and C. ochreatus cannot be synonyms, as was suggested by some previous workers. The question of whether Lobochironomus "sp. Ya6" might be conspecific with C. macani is also discussed.

Key words: Chironomus, Chaetolabis, Karyosystematics, Polytene chromosomes, Inversion polymorphism

Introduction

Chaetolabis was created by Townes (1945) as a subgenus of the genus “Tendipes” (now Chironomus Meigen 1803). Townes included two species that he named Tendipes (Chaetolabis) atroviridis (type of the subgenus) and T. (Chaet.) ochreatus. The former name was proposed for material he thought had been misidentified as Chironomus viridicolis van der Wulp, 1859 by various North American workers. Since then, Chaetolabis has been treated as a valid subgenus practically unanimously. Yamamoto (1987) has suggested raising it to generic level, on the basis of the characteristics of the antepronotum, but this has not been accepted. The present paper does not aim to address this issue, but to look at some other questions to which analysis of polytene chromosomes may provide answers.

To date five species have been recognized as valid in Chaetolabis: C. atroviridis, Townes 1945, C. ochreatus Townes, 1945, C. macani Freeman, 1948, C. globulus Filinkova and Belyanina, 1993 and C. bitumineus Langton and Vallenduuk, 2013. The polytene chromosomes have been described for only two of these species, C. bitumineus (as C. macani) by Wülker (1987) (see Langton and Vallenduuk, 2013) and C. globulus in the original description of that species. Wülker (1987) made reference to C. atroviridis having four polytene chromosomes, and C. ochreatus only three, based on my earlier unpublished work. This paper will describe and figure the polytene chromosomes of these latter North American species, expanding on the brief descriptions in Proulx et al. (2013), and will describe the chromosomes of North American larvae assigned to C. bitumineus by Langton and Vallenduuk (2013). The results are then used to evaluate whether the named species are all distinct, and whether C. bitumineus truly has a Holarctic distribution, as has been surmised from larval external morphology.

The major taxonomic problem in this subgenus is that the males are so similar that it has been uncertain how many species there are. Thus Wiederholm (1979), for example, queried whether C. atroviridis, C. ochreatus, and C. macani might be synonyms for a single species, and at the same time misapplied the name C. macani to material now identified as C. bitumineus (Langton & Vallenduuk 2013). In North America, the late J.E. Sublette (unpublished data) was unable to distinguish the adult males of C. atroviridis from those of an undescribed species, although associated larvae showed four polytene chromosomes in one species versus three in the other. This led to both species being called “C. nr. atroviridis” but distinguished as cytospecies “2h” and “2i” (see Martin 2014), until Langton and Vallenduuk (2013) proposed that sp. 2h was C. bitumineus, with 3 polytene chromosomes. That
particularly to those of *C. atroviridis* as described in this paper. This comparison shows considerable similarity between the banding patterns in *C. atroviridis* and sp. Ya6. Arms C and F appear to be identical in the two species; arm G is very similar and has the N and two BRs in the same relationship. The remaining arms differ by inversions that do not correspond to the intraspecific polymorphisms in each of the species and may differ by several inversion steps. Nevertheless, the existence of similar banding patterns in at least two arms would indicate that sp. Ya6 is closer to *C. atroviridis* than it is to any of the three *Lobochironomus* species studied by Ryser *et al.* (1985). Consequently, it is quite conceivable that Langton and Vallenduuk (2013) were correct in assuming that the larvae they had sent for karyological examination were those of *C. macani*, i.e. that sp. Ya6 actually is *C. macani*.

Whatever the appropriate subgeneric placement of *C.* sp. Ya6, one thing is certain: the current perception that larvae of *Chaetolabis* and *Lobochironomus* differ in the absence versus presence of posterolateral tubules (= lateral tubules of Sæther 1980) of body segment 10, such that *Chaetolabis* have a thummi-type larva (without such tubules), while *Lobochironomus* have a plumosus-type larva (with such tubules), must be treated with extreme caution, since the larvae of sp. Ya6 from the Netherlands are thummi-type (Langton & Vallenduuk 2013), while those from Yakutia are plumosus-type (Kiknadze *et al.* 1996b), indicating that this character is an intraspecific polymorphism, as it is in some species of the subgenus *Chironomus* (Proulx *et al.* 2013).

The overall conclusion from this study is that, despite the noted similarity in morphology (Wiederholm 1979), the species *C. atroviridis*, *C. bitumineus* and *C. ochreatus* are distinct species. Furthermore, if sp. Ya6 really is *C. macani*, then this species is also distinct on karyosystematic grounds.

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**References**


