Lauterbornia 68: 83-93, D-86424 Dinkelscherben, 2009-12-17

Neglected and new characters in Chironomidae: Tanypodinae (larvae)

Henk Vallenduuk and Andrea Lipinski

With 17 figures

Keywords: Tanypodinae, Chironomidae, Diptera, Insecta, morphology, identification, feature
Schlagwörter: Tanypodinae, Chironomidae, Diptera, Insecta, Morphologie, Bestimmung, Merkmal

In 2007 Henk Moller-Pillot and Henk Vallenduuk published a key to the larvae of the Tanypodinae (Diptera: Chironomidae). With untill then neglected and some new characters used in a new key the identification of the larvae will be very easy and reliable. Examples of these characters are shown and discussed in the following.

1 Introduction

For a long time specialists and hobbyists have been publishing keys to identify insects. They study the material to find details in features that can be used to separate species, in many cases using the characters described in previous publications. However, the recently published key to the larvae of the Tanypodinae (Diptera: Chironomidae) by Vallenduuk and Moller Pillot (2007) incorporates new characters that make identification of the larvae easy and reliable. When studying the larvae of the Tanypodinae during the preparation of this book, Vallenduuk discovered that some characters which can be used to separate species had previously been neglected or had never been examined before.

The method for finding good characters described in this paper can be of help to those who want to develop a key. The figures referred to in this paper are those in Vallenduuk and Moller Pillot (2007). We recommend first looking for macroscopic characters. We believe that by comparing species differences such characters can be found in any group of macrofauna.

2 The characters in Tanypodinae

To bring uniformity to morphological terminology, Saether (1980) published an illustrated glossary of chironomids showing the characters in imagos, pupae and larvae. This terminology is the current standard. Most of the characters used in keys to the larvae are features of the head, where many good characters can be found.

Another good feature is the setation of the thorax and abdomen. However, because setae can be broken off, the use of this feature in keys can cause problems and it is probably seldom used. We only use this character when the setation is very typically and very reliable. Rieradevall & Brooks (2001) studied the setation of the head capsule. These setae are hard to detect and so we decided not to use this feature.

2.1 Studying characters

When first studying the characters of larvae we recommend to use only larvae which have been identified with certainty. The following methods for obtaining reliably identified material are listed in order of decreasing certainty:
1. Rearing one larva to imago in a culture box (Fig. 1), or use slides made by specialists, on which all instars of one specimen have been mounted after rearing to imago.
2. Having associated larvae after identifying the pupal exuviae and/or imagos after they are caught in an emergence trap (Fig. 2). In this case it is possible that if one species is reared the remaining larvae can belong to another species. More than one species can occur at the same moment at the same site.
3. Collecting larvae at the same location where pupae or pupal exuviae are found. In this case the larvae collected at the same location may not belong to the same species as the pupal exuviae.

1

2

Fig. 1: Culture box for rearing Chironomidae larvae. Fig. 2: Emergence trap

Using reliable material, the first author started looking for new characters simply by comparing all species or groups of sibling species. He used his own material, obtained using method 1 above, and material given by Susanne Michiels (certified biologist, Emmendingen/Germany) and Marion Kotrba (Zoologisches Staatsmuseum München). He first looked for characters which can easily be seen with a dissectingr microscope at a magnification 10–60x. Once good (known and new) characters for identifying the larvae had been found, other unidentified larvae could be studied to check the characters.

2.2 Neglected characters

Postoccipital region

Features on this part of the head have never before been used in keys. The "tentorial line" and "tentorial pit" differ very much. Wide headed (Fig. 3) and elongate headed (Fig. 4) larvae can easily be separated by the presence and the shape of this line and pit.

Fig. 3: *Tanypus punctipennis*. Wide headed Tanypodinae larva, head ventrally. Sclerotized tentorial lines, laterally arising anteriorly from the postoccipital margin and ending in tentorial pits (arrow)

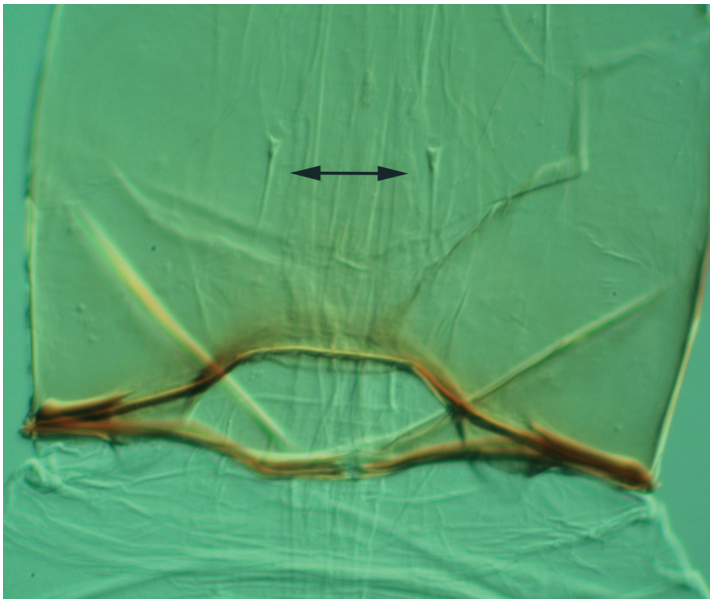

Fig. 4: *Paramerina cingulata*. Elongate headed Tanypodinae larva, postoccipital region dorsally with tentorial lines and tentorial pits (arrow). Tentorial lines and pits are hardly visible in elongate headed larvae, only when using a microscope they are visible!

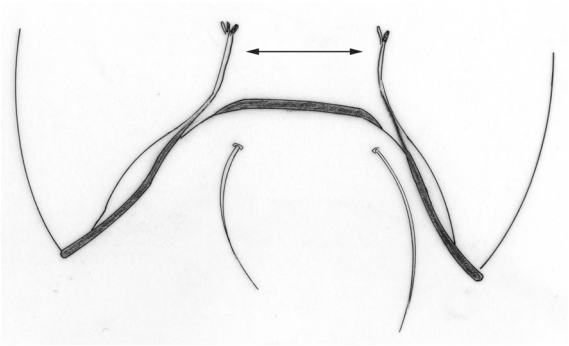

Fig. 5: *Procladius*. Postoccipital region ventrally with tentorial lines (arrow)

In wide headed larvae, for example, the genera *Procladius* and *Psectrotanypus* look very similar in general view. But when comparing the tentorial lines and pits it is very easy to separate these genera. In *Procladius* (Fig. 5) the tentorial lines are obvious, but in *Psectrotanypus* they seem to be absent (Fig. 6). In *Anatopynia*

plumipes the tentorial line is unique because it does not run to the postoccipital margin and creates a second line (Fig. 7).

The postoccipital margin has some hooks ventrally only in *Ablabesmyia* and *Zavrelimyia* (Fig. 8).

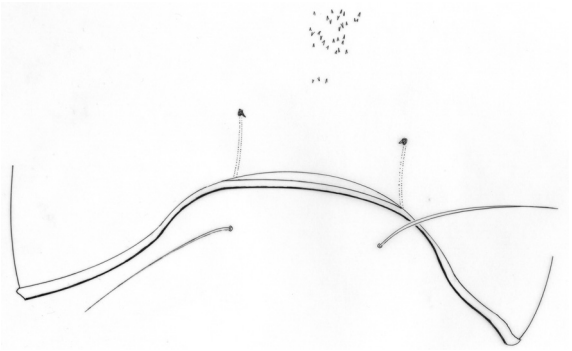

Fig. 6: *Psectrotanypus varius*. Postoccipital region, tentorial lines not clearly visible

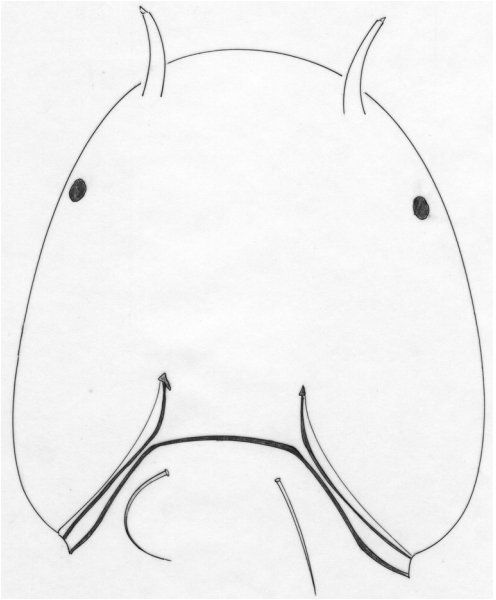

Fig. 7: *Anatopynia plumipes*. Head ventrally. Tentorial lines do not arise from the postoccipital margin, they create second lines

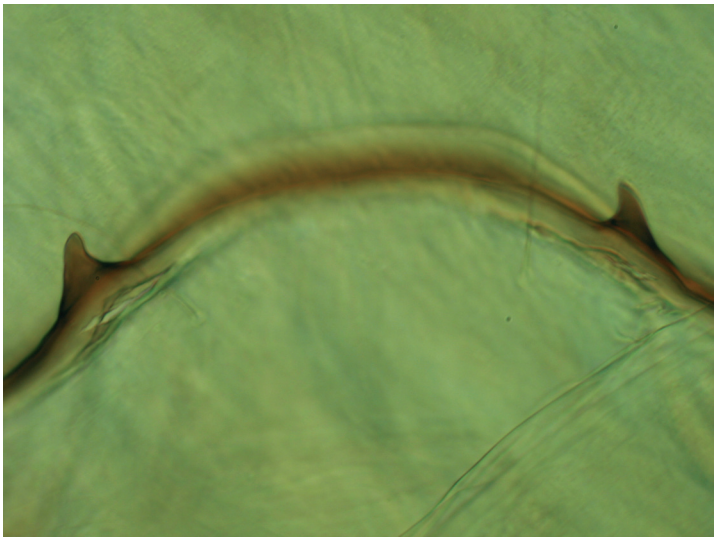

Fig. 8: *Ablabesmyia*. Postoccipital margin ventrally with hooks

2.3 New characters

Setation

The subfamily of the Tanypodinae is divided into two groups: wide headed and elongate headed species. These groups can be separated by the presence or absence of a lateral fringe of setae on the abdomen, which is usually used in previous keys. Other authors have found unique setation in some species. Goddeeris (personal communication) states that the setation of the prothoracic is unique in *Psectrotanypus varius* (Fig. 9). Only *Natarsia* has four lateral setae on each abdominal segment (Fig. 10).

The setation also differs in other species: three species of *Macropelopia* can be separated rather easily by the configuration of lateral setae on the mesothorax (Fig. 11, 12) or on abdominal segment VII. The thickness of the Ov-setae differs between species groups and between species (Fig. 13, 14). Only the larvae of the *Conchapelopia* aggregate have long dorsal setae (Fig. 15). However, setae can be broken off, particularly if the material is treated roughly or if it is very old. If the samples are treated with care, setation is a reliable character for separating certain species.

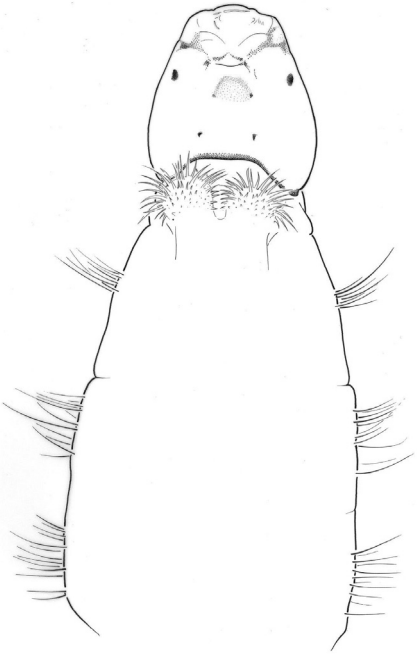

Fig. 9: *Psectrotanypus varius*. Thorax ventrally, lateral setation

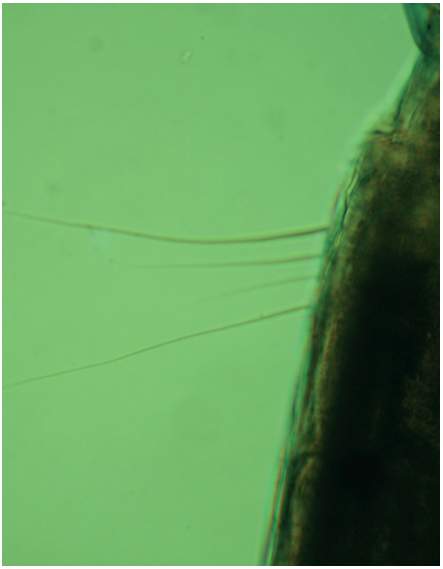

Fig. 10: *Natarsia*. Abdominal segment, lateral setae

Fig. 11: *Macropelopia adaucta*. Thorax, lateral setae

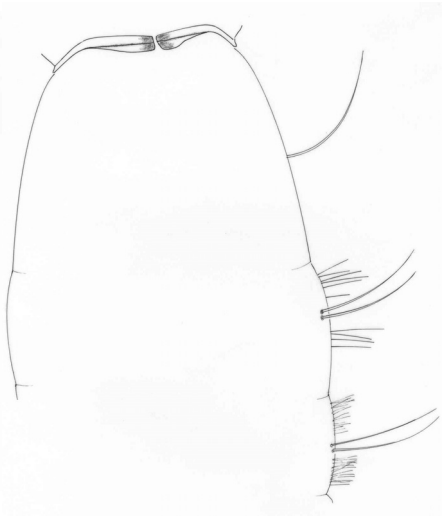

Fig. 12: *Macropelopia nebulosa*. Thorax, lateral setae

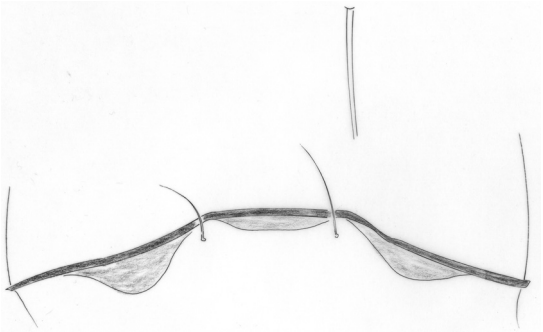

Fig. 13: *Schineriella schineri*. Postoccipital region, ventrally. Ov-setae at the anterior margin of the prothorax (only left tentorial line drawn)

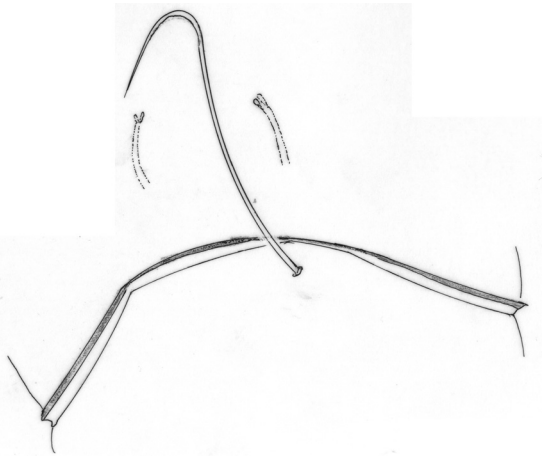

Fig. 14: *Conchapelopia*. Postoccipital region, ventrally. Ov-setae (only left seta is drawn)

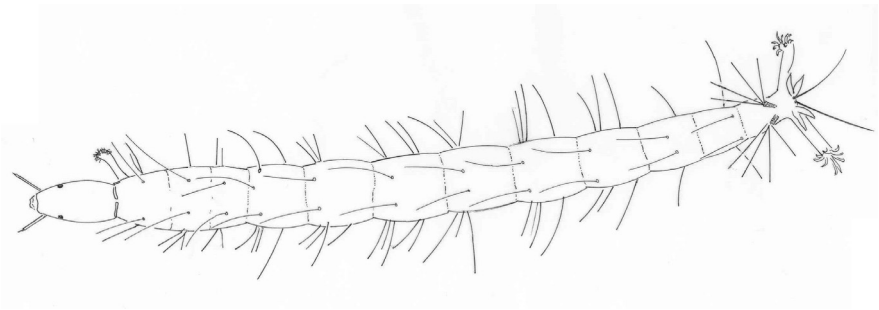

Fig. 15: *Conchapelopia*. Abdomen with long dorsal setae

Pigmentation
Pigmentation is a very reliable character for separating *Tanypus punctipennus* from the other two species in the genus. Only this species has a characteristic pigmentation between both tentorial lines (Fig. 3).

Shape of the head
The shape of the head is different in many species, especially in elongate headed species. This character was not used in the key due to time constraints, but the book contains tables with these head shapes (Fig. 16) (Vallenduuk & Moller Pillot 2007: 64-65.

***Conchapelopia* aggregate**
The *Conchapelopia* aggregate consists of species which are difficult to identify. The features "maxillary palp b seta" and "pseudoradula" are given in Fittkau & Roback (1983). Vallenduuk made drawings of the shape of the claws of the anterior parapods. All these characters can only be seen with a microscope at high magnification (400x), and so identification to the genera or species will be not always be possible.

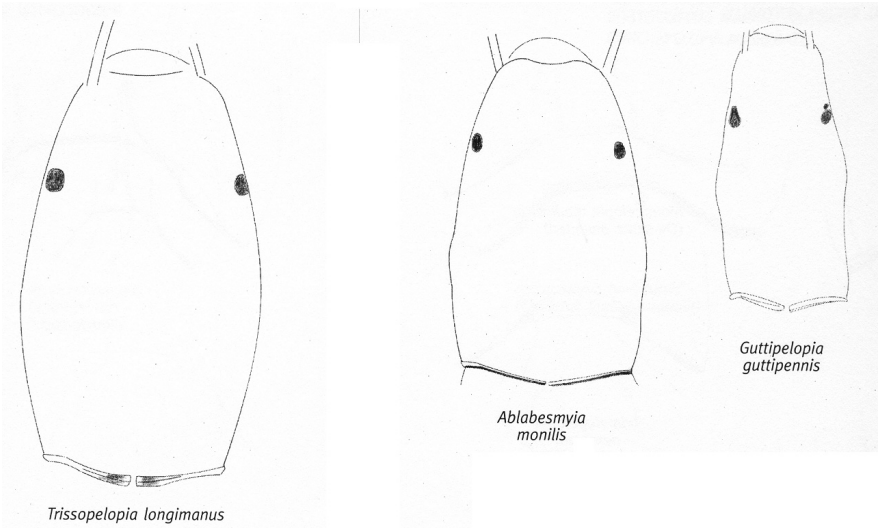

Fig. 16: Tanypodinae. Elongate-headed larvae, shape of some heads

2.4 Additional information about the morphology

The key in Vallenduuk & Moller Pillot (2007) contains distinguishing characters to identify individual species. The book also contains additional information on characters:
1. An overview of thoracic horns in prepupae (thanks to Dr Peter Langton).
2. Comments on the key, including some additional and relevant morphological characters and explanatory notes on the key for every species.
3. Tables of measurements and other features of characters for all species. Many species can be identified easily using the combination of characters given in these tables.
4. Figures showing the shape of the head and the postoccipital region for many genera and species (Fig. 17).

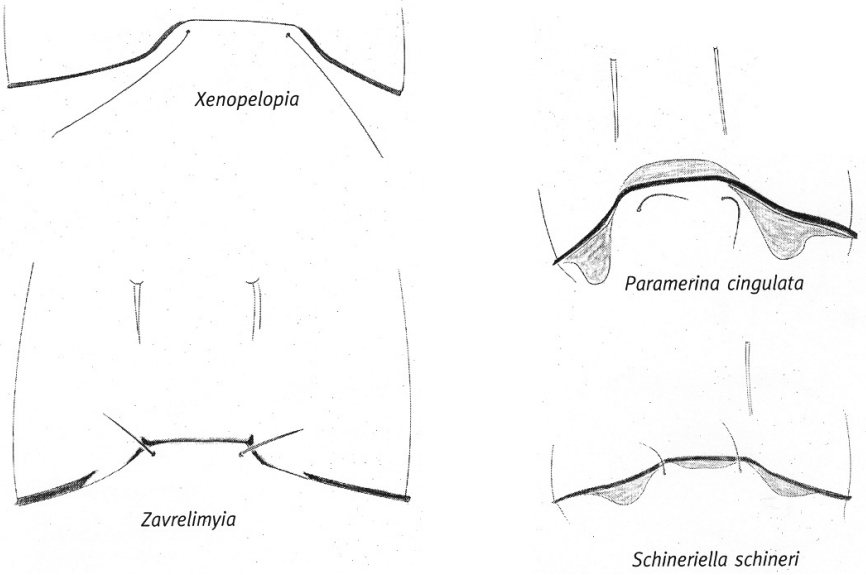

Fig. 17: Tanypodinae. Postoccipital region in some elongate headed larvae, ventrally

This key to the Tanypodinae larvae is the first one in a series of books on the Chironomidae to be published over the coming years. Whereas keys generally only describe the morphological characters used in the key itself, the authors have published all the information that could be gathered. Besides a key, the book contains additional information about the general ecology of Chironomidae and the morphology, systematics, biology and ecology of the Tanypodinae.

References

Fittkau, E. J. & S. S. Roback (1983): The larvae of Tanypodinae (Diptera: Chironomidae) of the Holarctic region-Keys and diagnosis.- In: Wiederholm, T. (editor): Entomologica Scandinavica , Supplement 19: 33-110, Copenhagen

Langton, P. H. (1991): A key to pupal exuviae of west Palearctic Chironomidae. – Private publication

Rieradevall, M. & S. J. Brooks (2001): An identification guide to subfossil Tanypodinae larvae Insecta: Diptera: Chironomidae) based on cephalic setation.- Journal of Palaeolimnology, 25: 81-99, Dordrecht

Saether, O. A., 1980. Glossary of chironomid morphology terminology (Diptera: Chironomidae).- Entomologica Scandinavica, Supplement 14: 1-51, Copenhagen

Vallenduuk, H .J. & H. K. M.Moller Pillot (2007): Chironomidae larvae Vol. I: General ecology and Tanypodinae.- 144 pp., (KNNV Publishing) Zeist

Address of the authors: Henk Vallenduuk, Spoorven 431, NL-5464 PA Veghel, The Netherlands,
email: buro.vallenduuk@home.nl
Dipl.-Ing. Andrea Lipinski, Jacobistrasse 19, D-26121 Oldenburg, drealipinski@gmx.de

Received: 2009-08-28