Corrigendum: Using DNA metabarcoding for assessing chironomid diversity and community change in mosquito controlled temporary wetlands. MBMG 2: e21060. https://doi.org/10.3897/mbmg.2.21060

Kathrin Theissinger¹, Anna Kästel¹, Vasco Elbrecht², Jenny Makkonen¹,³, Susanne Michiels⁴, Susanne I. Schmidt¹, Stefanie Allgeier¹, Florian Leese², Carsten A. Brühl¹

1 University of Koblenz-Landau, Institute for Environmental Sciences, Landau, Germany
2 University of Duisburg-Essen, Aquatic Ecosystem Research, Essen, Germany
3 University of Eastern Finland, Department of Environmental and Biological Sciences, Kuopio, Finland
4 AquaDiptera, Emmendingen, Germany

Corresponding author: Kathrin Theissinger (theissinger@uni-landau.de)

Explanation regarding the background leading to this corrigendum

The main reasons for this corrigendum were discrepancies between the detected number of chironomids in a report from 2014 and the MBMG article, published in 2018. In the MBMG article from 2018, overall more chironomids were reported that were not detected in the report from 2014. The reasons for this are outlined below.

In general, the abundance data used in this study were part of a project conducted in 2013, which investigated the influence of mosquito control with Bti on the food web. This study was approved and financed by the town Neustadt an der Weinstrasse (Germany). The township requested a project report, which was due in March 2014. By this time, the data were not finally evaluated. In particular, a taxonomic training course for determining Chironomidae subfamilies was attended later in the year 2014 by some of the project participants. After this training we found out that many chironomids of the subfamily Orthocladiinae were wrongly determined as Cecidomyiidae. This had direct impacts on the results and created differences in comparison to the report that was published 2014. All detected differences between the report and this manuscript are listed below in Table SII.

Table SII. Explanation of detected differences in chironomid abundances between the report from 2014 and the manuscript Theissinger et al. (2018), listed by sampling site and sampling week (WAA).

| Sampling site | WAA | Report 2014 | MBMG – manuscript | Explanation |
|---------------|-----|-------------|-------------------|-------------|
| S             | 2-13| identical; WAA 12 is missing | This site was not sampled in WAA12. |
| G             | 2-13| identical; WAA 11 is missing | This site was not sampled in WAA11. Due to weather conditions sampling in WAA 11 was interrupted, and the few samples collected in WAA 11 were pooled with the samples collected in WAA 12. |
| M             | 2-11| identical; WAA 12 is missing | This site was not sampled in WAA12. In this context we detected a typo in Suppl. Material 1 and 5, where we accidently indicated WAA12 instead of WAA 13. This mistake has now been corrected. (i.e., sample “12UM” -> “13UM” and sample “12FM” -> sample “13FM”. |
| M             | 15  | ~20         | ~50               | On the untreated site M in WAA13 some Orthocladiinae species had been wrongly identified as Cecidomyiidae instead of Chironomidae. After instructions of our chironomid specialist and co-author Susanne Michiels, this mistake was corrected. |
| CL            | 4   | <10         | -95               | In WAA4 some Orthocladiinae were previously wrongly determined (see above) and only later integrated into the data set. |
| CL            | 5   | <10         | -35               | In WAA5 some Orthocladiinae were previously wrongly determined (see above) and only later integrated into the data set. |
| CL            | 6   | <10         | -20               | In WAA6 some Orthocladiinae were previously wrongly determined (see above) and only later integrated into the data set. |
| CL            | 7   | <10         | -15               | In WAA7 some Orthocladiinae were previously wrongly determined (see above) and only later integrated into the data set. |
| CL            | 10  | <30         | -50               | In WAA10 some Orthocladiinae were previously wrongly determined (see above) and only later integrated into the data set. |
| CL            | 12  | <10         | NA                | From WAA11 onwards, 5 additional traps were deployed on this site for another side project. In these additional traps 10 chironomids were collected, which were included in the report, but not for the manuscript (for comparability reasons). |
| CL            | 13  | <120        | 40                | This discrepancy is due to the 5 additional traps (see above). The collected chironomids from these 5 traps were included for the report, but not in the manuscript. |

This site was not sampled in WAA 11. Due to weather conditions sampling in WAA 11 was interrupted, and the few samples collected in WAA 11 were pooled with the samples collected in WAA 12.

This is an open access article distributed under the terms of the Creative Commons Attribution License (CC BY 4.0), which permits unrestricted use, distribution, and reproduction in any medium, provided the original author and source are credited.
In this context of clarification, we came across some additional mistakes in the Microsoft Access data base query of the abundance data, where a filter was missing for excluding traps that fell dry during summer. Also, the project in 2013 was conducted over a longer period, namely 18 weeks after initial Bti application (WAA). In the MBMG article we only used the data until WAA13, because after this week too many traps fell dry, with only some data points for aquatic insects remaining. However, in the originally published MBMG article we falsely included emergence data of all individuals until WAA18, including terrestrial taxa from traps that fell dry. The re-calculation of the GLMM still resulted in a 65% significant chironomid reduction in the Bti-treated sites only until WAA4, but not across the entire study period. However, this 65% reduction has to be interpreted with caution because of the strong site heterogeneity and the potentially highly species specific Bti effect (see table below for further details). For full transparency, a new Supplementary Material 3 with all abundance data has now been added to the corrected version of our article.

Due to the strong within-site heterogeneity and the resulting highly variable numbers of chironomids detected per trap within each site, we reduced our overall statement of a clearly negative Bti effect on the chironomid community. In this context we have rearranged and added some text parts, which can be found with tracked changes in the new Supplementary Material 6.

The authors apologize for any inconveniences resulting from these changes and want to explicitly thank the editorial staff for the very thorough review of our study and support in correcting the mistakes.

Finally, we would like to point out that the mistake only affected the overall abundance data, but the metabarcoding part of the study was not concerned and has not been changed.

Below we point out the main changes to be considered by the readers:

### Abstract

The re-calculation of the GLMM still resulted in a 65% significant chironomid reduction in the Bti-treated sites only until WAA4, but not across the entire study period. However, this 65% reduction has to be interpreted with caution because of the strong site heterogeneity and the potentially highly species specific Bti effect (see below for further details).

### Methodology – Study sites/ page 3, second paragraph

Further information on discrepancies of Bti treatment on the respective sites has to be considered: The helicopter application took place on April 10, 2013 using IcyPearls (Vectobac WG, ValentBiosciences) at a concentration of 1.44 × 10^9 ITU/ha for M and 2.88 × 10^9 ITU/ha for S and G. Despite different Bti application rates, we subsequently categorized the further treated sites of the areas M, S, and G as “Bti-treated”, the first season untreated sites of M, S, G as “untreated” and the control site CL as “never treated”. On the application day and over the following week, water depth at all sites varied only marginally (21 to 24 cm).

### Results – Emergence data/ page 3

Further explanation of sampling scheme and timing has to be added: “Samples of traps that fell dry during the sampling period were not evaluated to minimize the presence of terrestrial chironomids in the data set. No sampling was conducted at site G in WAA11 and at sites S, M and CL in WAA12 due to bad weather conditions.”

### Discussion – Bti effects on chironomid community composition...

The last sentence highlighting the comparison of four study sites has to be deleted.

### Supplementary Material 3

A new supplementary Table 4 was added showing “All abundance data of aquatic emergence over 13 weeks after Bti application (WAA) across all sites (G, M, S, CL), treatment groups (“Bti – untreated”, “T = Bti – treated”) and traps (1 – 5). This updated Supplemental material 3 also includes a new Figure with Chironomid abundances across all traps per site, which have been log transformed for better readability.