

**Dear Reviewer 1,**

Thank you for your valuable comments regarding our manuscript. We have carefully and conscientiously revised our manuscript based on your comments and suggestions.

In a few cases, we would like to explain certain discrepancies:

**Rev:** (2) The copepod *Diacyclops languidoides* is not a stygobiont by definition; it was described in mires from northern Sweden by Lilljeborg and found in lake littoral environments in Finland. Being a species complex, we cannot be sure the species in Poland and in Sweden is the same; if this is true as probable, even this copepod is a stygophilic (i.e. a non-stygobiont following the terminology used in the paper); I let to the Authors to think about this point that can change the (already low) percentage of stygobionts

**Authors:** We agree with the reviewer's observations regarding the species *Diacyclops languidoides* that it is a difficult species to define in terms of the definition of stygobiont. However, in our manuscript, as suggested, we clarified while we have classified this species as a *D. languidoides* - group but as a stygobiont.

**Rev:** (4) In fig. 4 it is clear that the curve is a species rarefaction curve, not a species accumulation curve. The caption of Y axis is correct, however each point has a standard deviation, being a replica of randomly chosen values, not the row species richness value); this is the difference between a rarefaction (quite smoothed) curve and an accumulation curve (when only row values, and no s.d., should appear); please correct this in figure caption and text. This does not change anything about results.

**Authors:** We used the Species Accumulation Plot routine in PRIMER 7, with the option of randomizing the original sample order 9,999 times. In this procedure, the resulting curves are averaged (with standard deviations) to provide a smooth relationship between the average number of species and the number of replicates. The analytical form of this average accumulation curve (across all permutations) was described by Ugland, Gray & Ellingsen (2003, *J. Anim. Ecol.* 72: 888–897). We acknowledge, however, that when samples are arranged in their original or any user-defined order (i.e. reflecting non-arbitrary spatial or temporal sequences), the resulting accumulation curve appears as a jagged or stepped function.

**Rev:** I suggest this is an interesting paper and the statistical methodology is correct. However, the number of species is very poor, the number of stygobionts is poor as well, and this may influence the results, concealing seasonal differences, increasing beta diversity, and making results less robust (especially due to the high percentage on unidentified copepods). I strongly suggest authors emphasize these points in the discussion: apart undetermined species, there is nothing they can do, this is the situation in their town: a very poor groundwater fauna, and this result may be interesting in itself.

**Authors:** We agree with the reviewer's assessment that the number of species in groundwater is low, but this is characteristic for Central Europe groundwaters. Our materials and obtained results show the image of macroinvertebrate richness and diversity in aquatic subterranean environment in Kraków. In the discussion, we highlighted and clarified this point in relation to the results of other researchers.

List of all relevant changes made in the manuscript:

Line 35: stygobiontic was changed on stygobitic

Line 37: *Diacyclops languidoides* was changed on *Diacyclops* gr. *Languidoides*

Line 39: near complete was changed on exhaustive

Line:74: was added new citation: by Moniez (1888-1889) in Lille (France)

Line143:water properites was changed on water chemical and physical parameters

Line 151: theoretical was deleted

Lines 163-164: Gamma diversity and Beta diversity was changed on gamma diversity and beta diversity

Lines 168-170: stygobiontic species and non-stygobiontic species were changed on stygobitic species and non-stygobitic species

Line 195: (Dumnicka et al., 2025) was deleted

Line 199: (see Dumnicka et al.,2025; Fig.3 here) was changed on (Fig.3)

Lines 205: stygobiontic and non-stygobiontic species were changed on stygobitic and non-stygobitic species

Lines 206-207: sentence: Interestingly, annelids and crustaceans occurred largely allopatrically (Table 1) was changed on : Interestingly, there is low co-occurrence of the annelids and crustaceans within the same wells (Table 1).

Line 209: (see Dumnicka et al., 2025) was deleted.

Line 222: stygobiontic was changed on stygobitic

Line 225: stygobiontic was changed on stygobitic

Lines 233-234: was added new correct sentence: A species belonging to *Diacyclops languidoides* group, recorded in a single well, was considered stygobitic (Table 1).

Line 243: stygobiontic was changed on stygobitic

Line 265: stygobiontic was changed on stygobitic

Line 307: was added citations: Moniez 1888-1889; Hahn et al., 2013

Line 315: was added: what can be partially caused by low number of taxa.

Lines 324- 331: two sentences was added: These values appear higher than those reported for urban wells in other Central and Northwestern European cities (Moniez, 1888-1889; Jaworowski, 1893; Řehačková, 1953; Hahn et al., 2013), where the number of recorded stygobitic species was generally low, ranging from zero in the historical survey in Kraków (Jaworowski, 1893) to five in Prague (Vejdovský, 1882). The species accumulation curve based on our data did not reach saturation. The low mean species frequency (2.1 wells), with no significant differences between stygobionts and non-stygobionts, suggests that additional sampling would likely yield further species.

But sentence: However, the species accumulation curve did not reach saturation. The low mean species frequency (2.1 wells), with no significant differences between stygobionts and non-stygobionts, suggests that additional sampling would likely yield further species- was deleted.

Line 347: only one stygobiont was changed on *Diacyclops* gr. *languidoides*

Line 348: new citation was added: (Kur et al., 2020)

Lines 348-362: few sentences were added : This taxon has also been occasionally recorded from lakes in Poland (Kur and Wojtasik, 2007) but due to its sporadic occurrence in surface inland waters, its predominantly subterranean distribution, and existing taxonomic uncertainties within this complex, *Diacyclops* gr. *languidoides* from the Kraków well is treated here as a stygobitic species. Stoch (1995) highlighted the difficulties associated with classifying this species complex, arguing that such classification should take into account ecological factors, such as habitat heterogeneity, environmental stability, and biotic interactions, as well as evolutionary processes, including multiple colonization events and diversification through niche differentiation. Later, Stoch (2001) also pointed out that the importance of these factors in the formation of freshwater invertebrate communities – especially subterranean ones – remains poorly understood, and suggested that advances in copepod taxonomy would contribute to our understanding of broader questions in theoretical biology. Moreover, the genus *Diacyclops* appears to be highly diversified in the underground waters of Romania, where several species of the *D. languidoides* group are yet to be described (Iepure et al., 2021).

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Line 377: stygobiontic was changed on stygobitic

Line 381: stygobiontic was changed on stygobitic

Line 397: stygobiontic was changed on stygobiont

Line 400: was added: where total number of species most often is low

Lines 410-415: the new sentences were added: This community occurred in old city center (wells 84-86 and 91) or in elevated area (well 69) with no direct connection to surface water. In conclusion, although species richness and abundances of annelids and crustaceans were relatively low and dominated by surface water taxa, the occurrence of six stygobitic species in 10 of 47 wells with crustaceans and/or annelids (or of 28 wells with species-level identifications) suggests that 1/5 to 1/3 of wells in Kraków may offer relatively good ecological conditions.

The sentence: In conclusion, although species richness and abundances of annelids and crustaceans were relatively low and dominated by surface water taxa, the occurrence of six stygobiontic species in 10 of 47 wells with crustaceans and/or annelids (or of 28 wells with species-level identifications) suggests that 1/5 to 1/3 of wells in Kraków may offer relatively good ecological conditions- was deleted.

Lines 420-424: two sentences were added: Although the fauna of urban wells in Central Europe is generally species-poor, studies of these habitats may help explain important questions, for example the pathways and timing of species migration from surface to underground waters or between isolated aquifers. Moreover, identifying sites that host the richest fauna and stygobiont populations may serve as a basis for establishing appropriate conservation.

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Line 670: In table 1: copepodites was changed on copepodits

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**Dear Reviewer 2,**

Thank you for your opinion and valuable comments regarding our manuscript.

**Rev 2:** I have only a few minor comments on this manuscript, which I have noted in the PDF.

**Authors:** Your comments were taken into account in the text.

**Rev 2:** It is somewhat regrettable that DNA barcoding was not undertaken in this study, particularly since the material was, as I understand it, adequately preserved for future molecular analyses. I acknowledge, however, that this approach is not always feasible for all research groups. In the present case, the study based solely on morphological identification already yields interesting results, which could be further refined using molecular data. For example, in the case of oligochaetes, barcoding would help clarify the actual taxa involved, especially within species complexes such as *Enchytraeus* group *buchholzi*, *Marionina argentea*, or *Trichodrilus*. In other words, more precise taxonomic identification would allow for more robust ecological analyses. I hope the authors will have the opportunity to pursue this direction in the future.

**Authors:** It was not possible to perform DNA barcoding tests during the analysis. In the future, we intend to seek out collaborators involved in DNA barcoding analysis more actively.

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