




Two sides of tropical richness, parasitoid wasps collected by Malaise traps in tropical rainforests of South America and Africa

Giovanny Fagua based on peer reviews by **Filippo Di Giovanni**, **Mabel Alvarado**  and 2 anonymous reviewers

Tapani Hopkins, Hanna Tuomisto, Isrrael C. Gómez, Ilari E. Sääksjärvi (2024) A comparison of the parasitoid wasp species richness of tropical forest sites in Peru and Uganda – subfamily Rhyssinae (Hymenoptera: Ichneumonidae). bioRxiv, ver. 2, peer-reviewed and recommended by Peer Community in Zoology.

<https://doi.org/10.1101/2023.08.23.554460>

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Insect species richness and diversity comparisons between samples of the tropics around the world are rare, especially in taxa composed mainly of cryptic species as parasitoid wasps.

The article by Hopkins et al. (2024) compares samples of parasitoid wasps of the subfamily Rhyssinae (Hymenoptera: Ichneumonidae) collected by Malaise traps in tropical rainforests of Perú and Uganda. The samples presented several differences in the time of collecting, covertures, and the sampling number; however, they used the same kind of traps, and the taxonomic process for species delimitation was made for the same team of ichneumonid experts, using equivalent characters.

Publications about this kind of comparative study are difficult to find because cooperative projects on insect richness and diversity from South American and African continents are not frequent. In this sense, this study presented a valuable contrast that shows interesting results about the higher richness and lower abundance of the biota of the American tropics, even with a small sample, in comparison with the biota of the African tropics. The results are supported mainly by the rarefaction curves shown. This pattern of higher species richness and lower specimen abundance, observed in other American tropical taxa such as trees, birds, or butterflies, is observed too in these parasitoid wasps, increasing the body of information that could support the extension of the pattern to the entire biota of the American tropics. The authors recognize the study's limitations, which

include strong differences in the size of the forest cover between places. However, these differences and others are enough described and discussed.

This work is useful because it increases the information about the diversity patterns of the tropics around the world and because study a taxon mainly composed of cryptic species, with a small amount of information in tropical regions.

References:

Hopkins T., Tuomisto H., Gómez I.C., Sääksjärvi I. E. 2024. A comparison of the parasitoid wasp species richness of tropical forest sites in Peru and Uganda – subfamily Rhyssinae (Hymenoptera: Ichneumonidae). bioRxiv, ver. 2 peer-reviewed and recommended by Peer Community in Zoology. <https://doi.org/10.1101/2023.08.23.554460>

Reviews

Evaluation round #1

DOI or URL of the preprint: <https://doi.org/10.1101/2023.08.23.554460>

Version of the preprint: 1

Authors' reply, 16 February 2024

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Decision by [Giovanny Fagua](#), posted 15 January 2024, validated 15 January 2024

The current manuscript requires some changes to be accepted

Dear authors,

I agree with your reviewers about the good quality of analysis and good writing of your manuscript. However, I consider that the points mentioned by the anonymous reviewer 2 must be included to increase the quality of the paper.

Consequently, I strongly recommend following reviewer 2, plus the minor corrections of other positive reviews.

Sincerely,

Giovanny Fagua

Reviewed by anonymous reviewer 1, 14 November 2023

The work was carried out by experts in Darwin wasp taxonomy. However, the results obtained in different biogeographical areas, with their own characteristics, cannot be compared. The results could be published in two separate articles considering each area. The results were not consistently justified. and discussed.

Reviewed by [Mabel Alvarado](#) , 25 November 2023

Greetings,

It is an interesting approach to solve the question of which tropic is more specious and give more value and use to data already collected.

As they mentioned, the elevation of the sites is quite different. At least in countries crossed by the Andes, between lowlands (below 800m) and areas at mid elevation (such as 1500m) there is a strong turnover of species and at mid elevation, Rhyssinae, are less specious than in lowlands. I wonder how is this factor influencing in the composition of species in Africa? And, how valid is to compare sites with that elevation difference? These questions puzzle me and maybe a further discussion will be enlightening.

The manuscript is quite easy to follow but I found few form comments should be notice in the following lines:

Line 213, parenthesis missing.

Line 235, parenthesis missing, and citation mentioned twice.

Line 364, needs comas or some editing to make it easier to understand.

I suggest accepting the manuscript for publication.

All the best,

Mabel

Reviewed by anonymous reviewer 2, 17 November 2023

Dear editorial team,

I have examined the manuscript entitled "A comparison of the parasitoid wasp species richness of tropical forest sites in Peru and Uganda – subfamily Rhyssinae (Hymenoptera: Ichneumonidae)", currently under consideration for recommendation at PCI Zoology. In this work, the authors use data from long-term surveys using standardized sampling to compare the abundance and diversity of Darwin wasps (Ichneumonidae) in two sites in Uganda and Peru. Each of these sites had already been the subject of separate studies focusing on one sole area (e.g. Sääksjärvi et al. 2004, Gómez et al. 2017, Hopkins et al. 2019), so in that sense the data included herein is not "new", but this study adds new information by explicitly comparing the catches in both areas.

Long-term sampling in the tropics is of paramount importance to understand the global patterns of diversity in ichneumonids, a group long thought to be more diverse in temperate than tropical zones, but so far there have been limited such studies due to the logistical difficulties associated not only with collecting but with sorting, processing and identifying large numbers of specimens.

These difficulties represent both the major strength and weakness of this study. Strength, because as mentioned such long-term sampling is challenging and rarely done, and therefore any data derived from such comparisons incredibly invaluable. Weakness, because the study focus on a single subfamily of Ichneumonidae, which typically correspond to less than 1% of the total specimens of Ichneumonidae in Malaise trap samples. This means that the comparison between the two sites is based on 90 specimens collected in Peru and 444 specimens collected in Uganda. This is a relatively small dataset compared to the wealth of ichneumonid data collected in the field expeditions, so that the results should be seen as representative only in the relatively limited context of the Rhyssinae subfamily. It should be noted that the authors fully acknowledge this at multiple points of the paper and make no effort to "oversell" their results as being more generally applicable, but rather make the case that, should a comparison be done including all ichneumonid species, this would potentially be very illuminating, which is clearly the case.

Otherwise, the manuscript is well written, the methods are mostly clear and the figures are illustrative and useful. I appreciate that the authors provide a detailed explanation of their criteria for species delimitation, which are often not clear in other studies dealing with ecological surveys of hyperdiverse taxa in which not all specimens can be assigned to a named species. The authors apply a statistical model to correct for different amounts of rainfall in both regions, which is very clever and can may be broadly applied to the study of other taxa and localities.

In addition to comparing specimen abundance and species count, the authors use custom-made R functions to calculate metrics of evenness to allow a more sophisticated comparison of the diversity in both sites. While this is useful, I was a bit confused as to how these metrics compare to the more commonly used

Shannon and Simpson indices, which also incorporate evenness as a parameter to calculate diversity. Those metrics can also be interpreted as Hill numbers with q in the order 1 and 2 (Roswell et al. 2021; <https://doi.org/10.1111/oik.07202>), so I wonder why the authors did not use those more well-established metrics. At any rate, these evenness metrics are explored only cursorily in the paper, and in my opinion they could receive more emphasis as there is considerable evidence showing that metrics incorporating evenness outperform mere species richness for estimations of biodiversity.

I have also outlined some minor edits and suggestions to the main text in the attached file. Overall, I think that this is an interesting and well-written case study, even if its limited taxonomic scope makes it less impactful at a broader scale than one would hope for. Still, I would be happy to see this comparison published since the topic is quite relevant and the analyses well done and rigorous.

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Reviewed by **Filippo Di Giovanni**, 07 November 2023

dear Editor,

I found the article very interesting and well written. The methods used are relevant to the type of analysis conducted and the authors' conclusions stimulate debate on such an important topic as diversity estimation. I only have a few questions for the authors that I have listed as comments in the text, which could supplement the information already given, but I have no real changes to propose. I suggest accepting the paper after minor revision.

All the best

Filippo Di Giovanni

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