CZECH UNIVERSITY OF LIFE SCIENCES PRAGUE

Faculty of Tropical AgriSciences

Evaluation of the Diploma Thesis by Opponent

Thesis Title	**Modeling distribution and habitat suitability for snow leopard (Panthera uncia) in the Great Gobi-A Strictly Protected Area of Mongolia**
Name of the student	**B.Sc. Juno Shimada, BSc**
Thesis supervisor	**doc. Francisco Ceacero Herrador, Ph.D.**
Department	**Department of Animal Science and Food Processing**
Opponent	**doc. Ing. Vítězslav Moudrý, Ph.D.**

Formulation of the aims	**1**	2	3	4
Appropriate research methods	1	**2**	3	4
Fulfilment of the aims	**1**	2	3	4
The scientific contribution of the thesis and originality	1	**2**	3	4
The theoretical background of the author (literature review, theoretical background)	**1**	2	3	4
Data analysis	1	**2**	3	4
Handling with scientific literature (relevant citations)	**1**	2	3	4
Argumentation and critical thinking	1	**2**	3	4
Abstract and keywords	**1**	2	3	4
Structure of the chapters and paragraphs	**1**	2	3	4
Accuracy of terminology and comprehensibility	1	**2**	3	4
Formatting, layout and general impression	**1**	2	3	4
Evaluation of the work by grade (1, 2, 3, 4)				**1**

Evaluation: 1 = the best

Date 04/09/2024

el. signed by doc. Ing. Vítězslav Moudrý, Ph.D. *on* 04/09/2024 18:37
Signature of Opponent

Other comments or suggestions:

The submitted master's thesis employs species distribution models (SDM) to predict habitat suitability for the snow leopard in Mongolia and northern China. It utilizes state-of-the-art ensemble modeling techniques and occurrence records from GPS collars and camera traps. I appreciate that, in addition to the main objective, the author also considered the importance of input data. The author uses ten environmental variables for the modeling, which is a reasonable number. These variables represent climate, topography, landcover, and prey species distribution. It should be emphasized that including data on biotic interactions is uncommon yet very important in SDM. However, the prey data is an output of the model, which reduces its relevance. It would have been nice to also include data on competitors.

In the final paragraph of the Introduction, you mention "anthropogenic factors," but they are not included in the modeling, right?

On the other hand, the author did not avoid the typical naivety of ecologists when working with GIS and spatial data. Resampling is likely not the best technique to match resolutions. Additionally, the adopted methods are poorly described. For example, it is not specified which interpolation technique was used during resampling (e.g., nearest neighbors, bilinear interpolation; each suitable for different types of data, such as categorical land cover or continuous terrain variables). In this case, simply aggregating data to a coarser resolution using the mean (for continuous data) or the majority (for categorical data) would likely be a better solution.

Furthermore, in the discussion, you suggest that using the ALOS AW3D30 Digital Elevation Model is a novel approach because other studies have used SRTM. This is not accurate for several reasons, but most importantly, by the end, you had coarsened the data to a 1 km resolution, so any detail originally present in the higher-resolution data was lost.

Figure 6: Without units for the variables, the plots are useless. Is the precipitation measured in millimeters? What is the unit for prey (number, density—it could be anything)? It's unfortunate that you are able to run a complex ensemble model, but then produce results without units! I want you to remember this: units, units units !!!

It's also unfortunate that you do not show the predicted distribution of the prey. This could demonstrate that your finding—that prey distribution is the most important factor (which I agree is important, and you don't need a model to know this)—is merely a data artifact, but I speculate here and I might be wrong.

Personally, I found the comparison of the two data sources naive. One dataset is very small, and the other is from a single individual (and still small). The results were to be expected. What I miss is a more detailed discussion on the role of sample size in the models. If you choose to make such a comparison, you should provide a solid background and reasoning for doing so.

Please don't get me wrong—the work is very good. I took this as an opportunity to point out a few things that you should consider if you go in this direction further. I enjoyed reading the thesis.

Finally, I would also like to commend the reasonable length of the thesis, which focuses on the essential elements.

Questions for thesis defence:

You propose collecting more data, but if there is enough data, modeling may no longer be necessary. Where do you see the line between how much data is needed and when data collection becomes too expensive, making modeling a better option?

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