Immense mismatch between protected areas and biodiversity hotspots of Iranian Lepidoptera

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Supplementary Information I

I. Selection of environmnetal variables

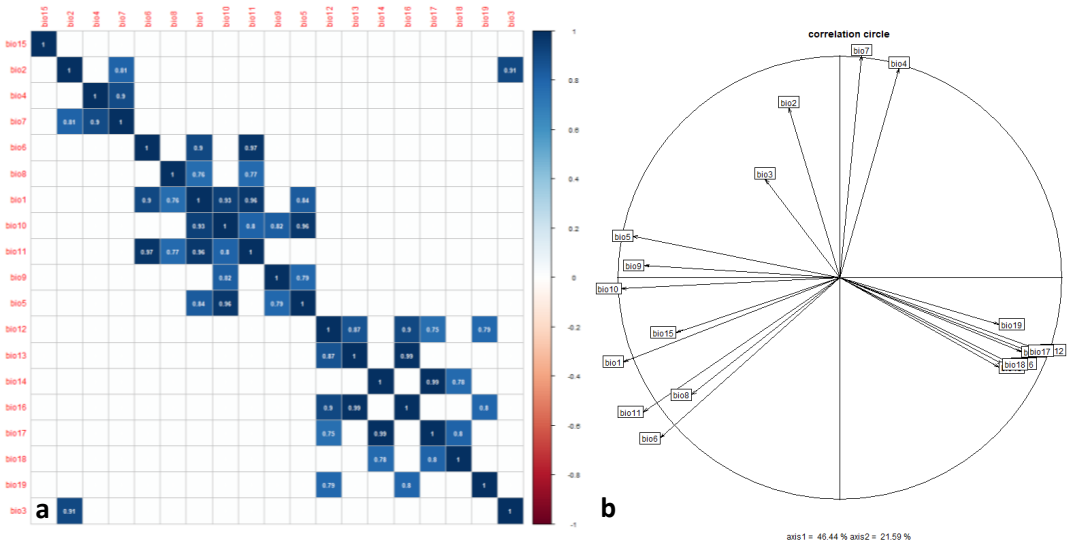

Figure S1. Five environmental variables were selected among 19 climate variables of CHELSA dataset (for more details see CHELSA, https://chelsa-climate.org) using a) pairwise Pearson's correlation coefficient (> 0.75) and b) The Correlation circle of variables resulted from Principal Component Analysis (PCA) to select the most independent

II. Conservation potential of PAs and NHAs

We did extra analysis to investigate the potential of each protected areas (PAs) and No Hunting Areas (NHAs) in conservation the priority hotspots (PHs) of Iranian Lepidoptera. The potential conservation of each 378 PAs and 187 NHAs were assessed by three criteria. 1) If the PAs or NHAs cover different levels of higher priority PHs. 2) Richness class: sum up the species richness within grid cells of each PAs and NHAs. 3) Coverage class: sum up of the protected areas of each PHs by PAs and NHAs. In the end we score the values of criteria 2 and 3 by four quantiles of the values (25%, 50%, 75%, 95%, and more than 95%) from 1 to 5. Therefore, the potential conservation score for each PAs and NHAs were calculated by summing up PHs class (from -2 to 4), richness class (1 to 5), and coverage class (1 to 5), and then the values converted to score (from 1 to 5) based on the quantile as already discussed above (Appendix II). Appendix II provides potential conservation of each PAs and NHAs, the PHs they are covered, species richness within them (minimum, mean, and, maximum), coverage area (km^2), and ranking score for richness, coverage, and potential conservation.

Figure S2 indicates PAs and NHAs in Iran with potential conservation score for different levels of priority hotpots (PHs) regarding Lepidoptera fauna. As shown in the map, the PAS and NHAs which cover areas with higher conservation priority have higher potential conservation scores.

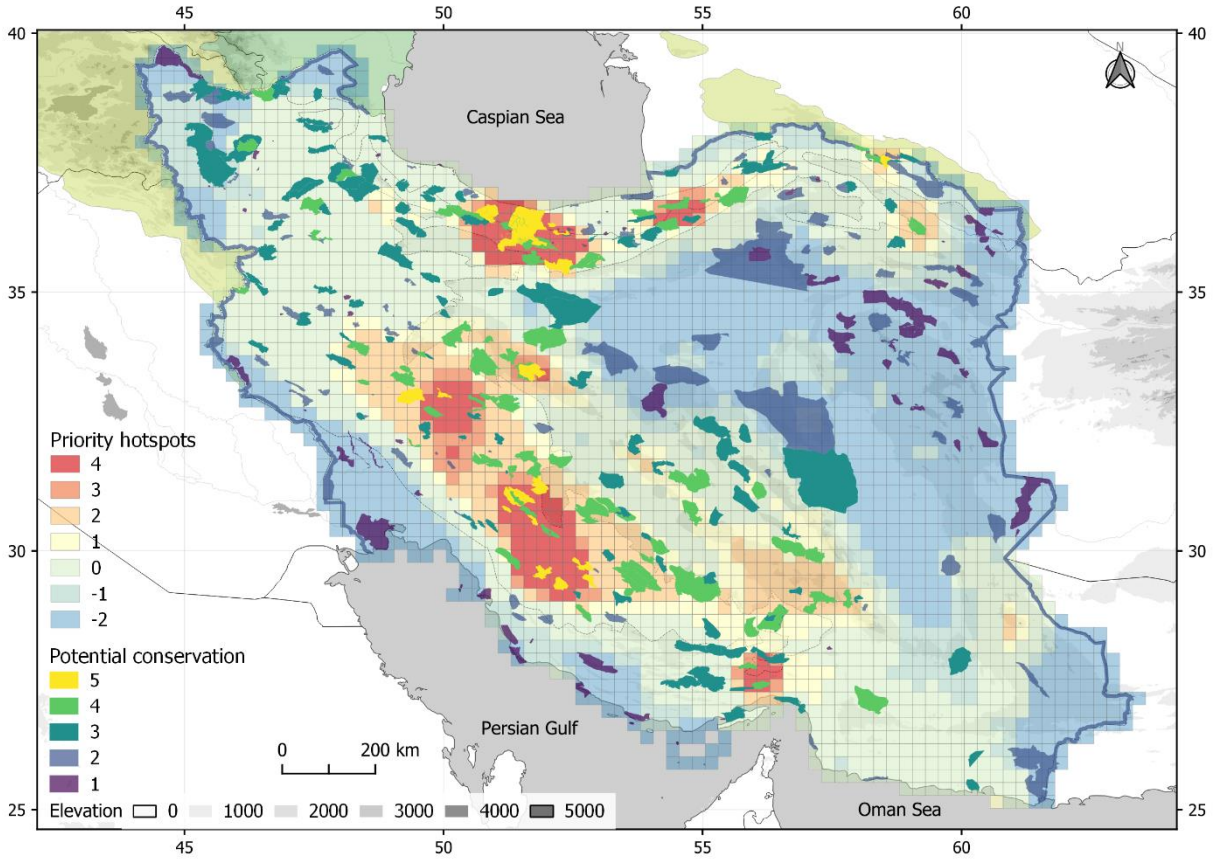

Figure S2. Potential conservation score of PAs and NHAs regarding conservation of PHs of Iranian Lepidoptera. Higher values of potential conservation score indicate more effective conservation of PAs and NHAs across PHs and species-diverse regions.

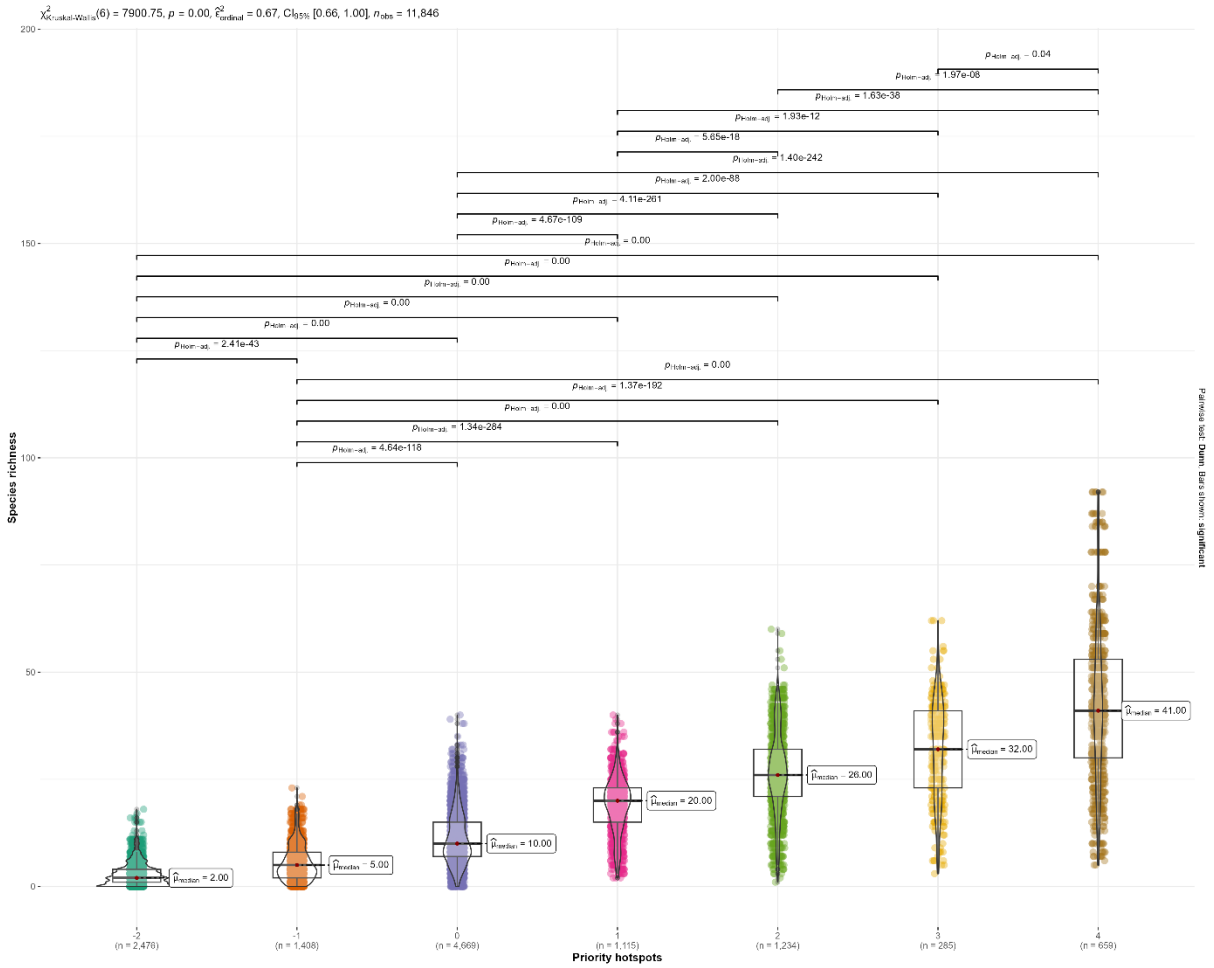

Figure S3. The graph indicates statistical difference between species richness within each PHs for Iranian Lepidoptera using Kruskal-Wallis'test. As shown in the graph species richness is statistically difference between different levels of priority hotspots and PH-4 has the higher number of endemic species of Lepidoptera.

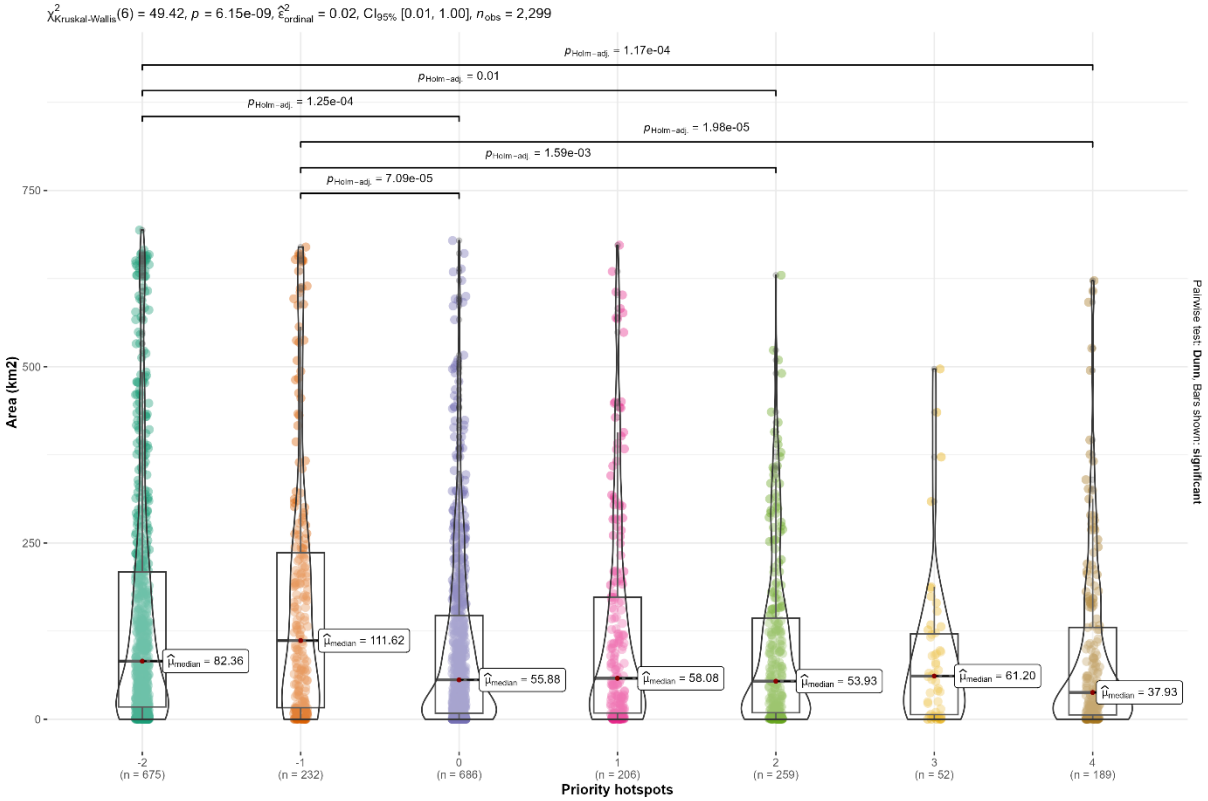

Figure S4. The results of Kruskal-Wallis'test for difference between coverage of PAs and NHAs across the different levels of PHs. As shown here, the coverage of the PAs and NHAs is significantly higher over coldspots and area with insignificant species richness.