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The Swiss Institute for Dryland Environmental & Energy Research (SIDEER)

MITRANI DEPARTMENT OF DESERT ECOLOGY

Automated assessment reveals extinction risk of reptiles is widely underestimated across space and phylogeny

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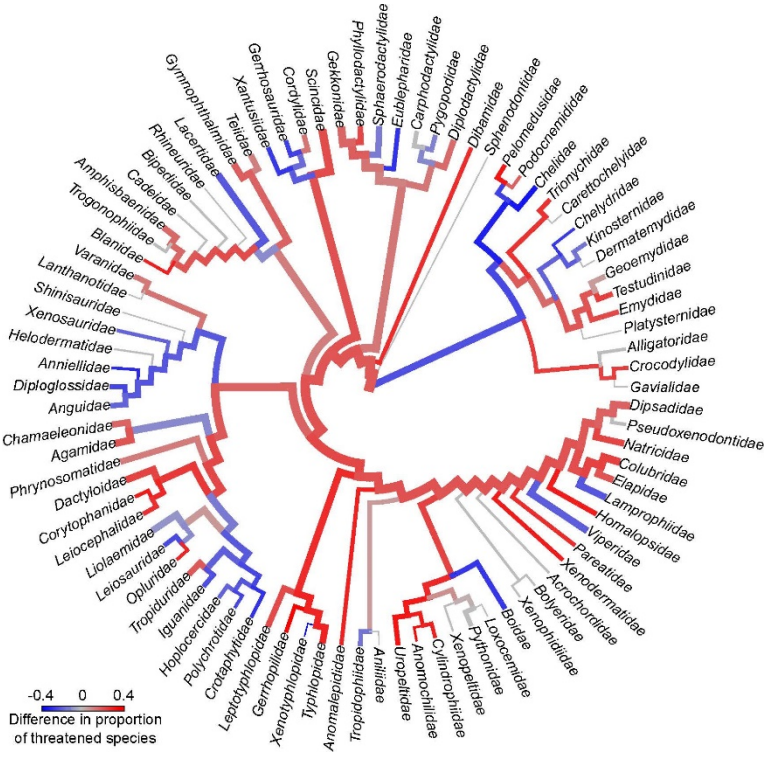
The Red List of Threatened Species, published by the International Union for Conservation of Nature (IUCN), is a crucial tool for conservation decision making. Despite substantial effort, numerous species remain unassessed or have insufficient data available to be assigned a threat category. Moreover, the Red Listing process is subject to various sources of uncertainty and bias, that might carry over to automated methods if unaccounted for. The development of robust automated assessment methods could serve as an efficient and highly useful tool to accelerate the assessment process and offer provisional assessments. We present a machine learning based automated threat assessment method that can be used on less known species and highlights potential assessor biases. We use it to assess 4,369 reptile species that are currently unassessed or classified as Data Deficient by the IUCN. We offer provisional assessments for all reptiles - the only major tetrapod group without a comprehensive Red List assessment. Our models range in accuracy from 88% to 93% for classifying species as threatened/non-threatened, and from 82% to 87% for predicting specific threat categories. Unassessed and Data Deficient reptiles were more likely to be threatened than assessed species, adding to mounting evidence that they should be considered threatened by default. In many ecoregions of the world (especially within the Americas and Australia) the proportion of threatened species greatly increased when we included our provisional assessments. Assessor identities strongly affected prediction outcomes, suggesting that assessor effects need to be carefully considered in extinction risk assessments. Regions and taxa we identified as likely to be more threatened should be prioritized in new assessments and conservation planning. Lastly, the method we present here can be easily implemented to help bridge the assessment gap on other less known taxa.



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