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Rhizostome fish forecasting using available data: international statistics and hooks

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ABSTRACT

As climate change accelerates, biodiversity declines, and ecosystems change, it becomes increasingly difficult to capture dynamic populations, track changes, and predict responses to climate change. At the same time, publicly available databases and tools will increase access to science, foster collaboration, and generate more data than ever before. One of his most successful projects is his AI-driven Social His Network, which also serves as a public database designed to allow citizen scientists to accurately report their personal biodiversity accounts. It's his iNaturalist. INaturalist is particularly useful for studying rare, dangerous and charismatic organisms, but requires better integration into marine systems. Despite their abundance and ecological importance, fish species are difficult to manage due to the lack of long-term datasets with large numbers of samples. 8,412 data curated from both iNaturalist (n = 7,807) and published literature (n = 7,807) to provide a large sample size dataset and demonstrate the utility of publicly collected data We synthesized two global datasets of 10 fish species of the order Rhizostomeae, including points. 605) included). These reports were then used in combination with publicly available environmental data to predict global niche segmentation and distribution. The first niche model revealed that only 2 out of 10 genres have different niche areas. However, application of machine learning-based random forest models suggests species-specific differences in the association of abiotic environmental variables used to predict fish populations. Our approach of integrating reports from the literature with iNaturalist data helped us assess the quality of the models and, more importantly, the quality of the underlying data. We believe that freely accessible online data are valuable but subject to bias due to their limited taxonomic, geographic and ecological resolution. With underrepresented local experts, celebrities and enthusiasts who can implement locally coordinated projects and increase global participation to improve the resolution and meaning of the data. We encourage you to cooperate.

Keywords: Fish: Random forests model; Online databases; Citizen science; Naturalist; Cnidaria

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INTRODUCTION

In order to strengthen data-driven management and conservation practises, worldwide monitoring systems must be established because human activities and climate change threaten biodiversity [1]. Science is more accessible than ever because to free, sophisticated computer tools and open databases that are available to anybody with internet access as the internet grows and the world gets more linked [2]. The ability for anyone to contribute to scientific knowledge, if used, facilitates environmental stewardship and increased scientific literacy while also producing sizable, publicly available datasets, making citizen science advantageous to both communities and scientists [3]. INaturalist, a social network and public database that combines computer vision, automated reasoning, and machine learning to improve the quality of the data, is one of the most well-known initiatives [4]. This platform allows non-experts to report expert-level data cultivating a community of passionate citizen scientists who have provided images documenting over 125 million wildlife reports as of January 2023. Naturalist has proven itself in conservation and management by identifying the distribution of rare, dangerous and charismatic creatures [5]. The parasite has a complex life cycle, typically characterized by the planula, polyp, and jellyfish stages. However, the most commonly observed is the swimming Medusa stage, which can cause noxious stings [6]. Fish bloom generally occurs when environmental conditions promote species-specific metamorphosis from a sessile 'polyp' morphology to a small planktonic 'ephyra' morphology and finally to a sexually mature 'jellyfish' morphology [7]. As a result, the biomass of certain fish species in coastal waters and fishing grounds has skyrocketed, leading to an increase in sting injuries among beachgoers and fishermen. Fish (rhizomes) are important components of marine trophic architecture and have biomedical relevance [8]. It is a compound that stings humans, threatens fisheries, and is an important food source for humans.

DISCUSSION

Inferring ecological niches

In the environmental aspect, most genera exhibited overlapping niche spaces. Interestingly, only the niches of Smolophus and Rhizostoma were inferred to differ from the other genera, and both genera had significant geographical overlap with another [9].
Smolophus covariated with Rhopilema and Rhizostoma covariated with Cotylorhiza. Despite overlapping distributions, niche segregation may help reduce

competition for resources between coexisting genera. In contrast, genera from which overlapping niche spaces were derived showed different geographical distributions. Although non-overlapping geographic distributions limit competition for resources, niche redundancy may be possible, but this perceived redundancy is the result of a bias in his GLM model. There is a possibility. Dynamic interactions between biotic and biotic and abiotic factors, known as ecological niche spaces, determine an organism's fitness to sustain its population in that space. The relatively coarse spatial and temporal resolution of the data used to build the model in this study may have masked low-resolution differences in niches between genera. GLM represents a well-understood statistical framework for modeling relationships between predictor and response variables, but data resolution obscures niche, high-resolution differences between genera [10]. There is a possibility that His RFM and machine learning at higher resolution suggested that salinity, temperature and/or silicate content were the most important predictors of rhizomes. Salinity and temperature were the most influential predictors for most genera. Nutrient concentrations (silicates, phosphates, nitrates) were usually traces. A notable exception is licunorhiza, whose distribution is thought to be rich in silicates, nitrates and phosphates. This result may seem intuitive at first once you understand the habitats that prefer nutrient-rich water. However, other fish typically found in nutrient-rich waters (such as Cassiopeia) did not show the same results. Presumably, this indicates a heterotrophic distribution given the covariance of plankton abundance and silicate, nitrate and phosphate levels. This is to be expected from the very high feeding rate of plankton. Conversely, Cassiopeia jellyfish are highly capable of autotrophic feeding and are more affected by temperature than by nutrients. Lichenorhiza is known for producing large, poisonous flowers. Therefore, coastal environmental managers seeking to improve their skills in predicting flowering (season, location, etc.) of lichenorhiza may choose to track nutrient levels in water to study possible associations. This interpretation is purely hypothetical and comes with its own limitations and prejudices. However, here we provide an example of how these models, together with a valuable world-oriented database, serve as the basis for hypotheses that will inform future experimental work, management strategies, and targeted regional studies.

CONCLUSION

The scientific community, especially in marine biology, struggles with accessibility and inclusiveness. In addition to systemic inequalities, many researchers lack access to adequate funding, sites and equipment, a problem easily mitigated by the development of public databases and tools. While these issues will remain for the foreseeable future, we believe that citizen science is a valuable tool for scientific research, providing both researchers and the public with meaningful results while reducing the height of the scientific reward barrier. I believe it provides an opportunity to make significant scientific contributions. Our results are just one of many approaches that may help address the shortcomings and challenges that arise in this type of research. By providing our curated rhizome datasets and associated models, we encourage the scientific community to use this database, while improving its quality and accuracy, and managing volunteer motivation and retention. , to address potential biases in participation. We propose the implementation of locally targeted citizen science projects as they can help address these challenges through improving data resolution and fostering global collaboration. This enhances the ability of these models to predict blooms, biological invasions, or covert populations, which are the main goals of fish management. We need to build partnerships with local relevant organizations, institutions and communities. This allows us to train and support citizen science researchers and use technology (such as artificial intelligence) to improve data collection and analysis, thereby increasing the effectiveness and sustainability of citizen science projects. Recognizing and addressing these challenges will help citizen science in advancing scientific understanding amid rapid change, promoting public participation in scientific inquiry, and reducing systemic inequalities.

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