

Plant size distributions on islands

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Summary

Plant size distribution relates to many important ecosystem properties such as productivity, biomass, carbon storage capacity. Therefore, it is important to understand what are the determinants of plants size distribution. Indeed, several studies already observed that plant size distribution is associated with island area and isolation. However, in order to move from observations to predictions, we need a mechanistic understanding. A promising venue is to improve a simple yet powerful model of species diversity, the Theory of Island Biogeography (TIB), that has been developed over 60 years ago. TIB and follow-up models uses island area and isolation to define a balance between species immigration and extinction. TIB gives an estimate of species richness on islands, but relies on the assumption that species are functionally equal. This means that every individual has equal chance to arrive and persist on the island, no matter its size or other traits. Nonetheless immigration and extinction should scale with plant size. Therefore, island biogeography models could (and should) be improved by incorporating allometric (size related) components. We applied allometric TIB model to 500 islands and their flora. We used the information on available in GIFT and TRY databases, which are the most extensive collections of data on floras and traits. They enabled ecologists to incorporate plant traits in biodiversity models. However, these databases contain a lot of missing data, even though the missing information can be found in thousands of scatter resources such as Floras, monographs and scientific papers. To harness this information for macroecological research, we are developing machine learning models for natural language processing and an automated trait-mining workflow. This will allow us to mobilize previously neglected information from existing literature and fill gaps in global trait databases, improve our models and facilitate future research.