

Wild grass species found unable to adapt rapidly enough to survive global warming

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(Phys.org)—A trio of researchers with the University of Arizona has found evidence that suggests many wild grass species will be at risk of disappearing from certain areas as the planet heats up. In their paper published in the journal *Biology Letters*, Alice Cang, Ashley Wilson and John Wiens describe the study they carried out on the speed with which wild grass species can adapt to change, what they found and what it might mean for the future of many important crops.

As the planet warms, many native plant communities will be forced to either adapt or migrate to prevent dying off. In this new effort, the researchers looked at many wild grasses that are related to modern crops, such as wheat and rice, and what their chances are of surviving the kind

of temperature increases that have been predicted over the next several decades.

More specifically, they looked at prior research done on 236 grass types, noting specifically an ability to adapt to a new niche, then compared the rates they found with temperature increases expected in the places where they now exist up to the year 2070. Alarming, they found that on average, global warming is expected to occur approximately 5,000 times faster than the average wild grass community is able to adapt. They noted also that slowly migrating to new places likely will not be an option for most of the grass species studied due to a variety of factors, ranging from limited seed dispersal to geographic obstructions such as mountains, bodies of water or human communities.

Overall, the researchers conclude that past rates of change for niche grasses occurred more slowly than is predicted for environmental changes in the near future, indicating that local extinctions are likely.

The researchers note that the related species humans use as crop foods will not be immune to the same temperature increases, but it is assumed humans will intervene to begin farming in places with more favorable conditions. But there is another problem: Wild grass relatives are still used to improve the crops we grow—they are bred with current crop species to add desired features such as an ability to produce even under drier conditions or to offer a better chance at fighting certain diseases.

More information: F. Alice Cang et al. Climate change is projected to outpace rates of niche change in grasses, *Biology Letters* (2016). [DOI: 10.1098/rsbl.2016.0368](https://doi.org/10.1098/rsbl.2016.0368)

Abstract

Climate change may soon threaten much of global biodiversity, especially if species cannot adapt to changing climatic conditions quickly

enough. A critical question is how quickly climatic niches change, and if this speed is sufficient to prevent extinction as climates warm. Here, we address this question in the grass family (Poaceae). Grasses are fundamental to one of Earth's most widespread biomes (grasslands), and provide roughly half of all calories consumed by humans (including wheat, rice, corn and sorghum). We estimate rates of climatic niche change in 236 species and compare these with rates of projected climate change by 2070. Our results show that projected climate change is consistently faster than rates of niche change in grasses, typically by more than 5000-fold for temperature-related variables. Although these results do not show directly what will happen under global warming, they have troubling implications for a major biome and for human food resources.

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