

Herbivore populations will go down as temperatures go up, study says

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As climate change causes temperatures to rise, the number of herbivores will decrease, affecting the human food supply, according to new research from the University of Toronto.

In a paper being published this month in [American Naturalist](#), a team of ecologists describe how differences in the general responses of plants and herbivores to temperature change produces predictable declines in herbivore populations. This decrease occurs because herbivores grow more quickly at [high temperatures](#) than plants do, and as a result the herbivores run out of food.

"If warmer temperatures decrease zooplankton in the ocean, as predicted by our study, this will ultimately lead to less food for fish and less seafood for humans," says co-author Benjamin Gilbert of U of T's ecology and [evolutionary biology](#) department.

Several studies have shown how the metabolic rates of plants or animals change with temperature. Gilbert and his colleagues incorporated these rates into commonly-used, mathematical models of plants and herbivores to predict how the abundance of each should change with warming. They then compared their predictions to the results from an experimental study in which phytoplankton and zooplankton populations in tanks of water shifted significantly with changes in water temperature.

Gilbert cautions that long-term tests are required. Nevertheless, if their predictions are right, global warming will cause large shifts in [food](#)

[chains](#) with consequences for global food security and species conservation.

More information: The paper entitled "Theoretical predictions for how temperature affects the dynamics of interacting herbivores and plants" was written by co-authors Gilbert and Mary O'Connor with Chris Brown of the University of Queensland.

Provided by University of Toronto

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