Poleward and vertical migration of animals under climate change highlights possible environmental effects on social behaviour

Wenfa Ng

Novena, Singapore, Email: ngwenfa771@hotmail.com

Abstract

Temperature rise from climate change may completely change geological landscapes and environmental conditions at habitats previously conducive for specific animal species. Together with increasing difficulty in coping with greater fluctuations in temperature between seasons as well as reduced or enhanced precipitations in areas normally accustomed to consistent patterns of rainfall, variation in nutrient availability is another significant factor impacting on the survivability of animals in a specific area, particularly those in the mid-latitudes and on mountain slopes. Thus, prompted by the lack of nutrients or availability of water arising from climatic changes, many warm and cold-blooded species may migrate towards polar regions as well as higher altitudes of mountains in search of more habitable conditions. Such migrations open up myriad research opportunities into understanding how predators and prey adapt to changes in environmental factors and nutrient availability under climate change, which is accelerating in the polar regions. Specifically, predators and prey may differentially move to different locales with predators having to adapt to new food sources or change their foraging patterns, which, in turn, may impact on their social behaviours on parenting and hunting habits. An example would be lack of food sources prompting predators high in the food chain to adapt by having fewer offsprings, switching to available but less nutritious food, as well as changing foraging patterns. On the other hand, prey may use changes in geological formations between habitats to adapt their breeding patterns as well as foraging activities; for example, using camouflage available in the new environment to better protect their young from new and old predators. Similarly, species on the vertical transect of mountains would also move to higher altitudes to adapt to heat from global warming, or execute a poleward movement in search of more conducive habitats. Altogether, many interesting research directions are awaiting exploration as animal species move towards the poles or higher altitudes on mountains, prompted by rising temperatures that changed environmental conditions and nutrient availability. Mass migrations such as these may potentially unsettle entire ecosystems as species able to adapt to higher temperatures benefit from reduced competition, while those choosing the migratory path face an uncertain future in finding a habitable niche similar to the abandoned one, as well as ability to adapt to the new locale in foraging behaviour, breeding patterns and social behaviour. Possible changes in social behaviour is one significant area for understanding how climate change induced migration exert a selection pressure on animal behaviour and neural development. Interested researchers can expand on the ideas presented in this abstract preprint.

PeerJ Preprints | https://doi.org/10.7287/peerj.preprints.2696v1 | CC BY 4.0 Open Access | rec: 4 Jan 2017, publ: 4 Jan 2017

Keywords: social behaviour, climate change, global warming, nutrient sources, mass migration, temperature rise, environmental factors, foraging behaviour, breeding patterns, adaptation,

Subject areas: zoology, animal behaviour, conservation biology, biogeography, biodiversity,

Conflicts of interest

The author declares no conflicts of interest.

Author's contribution

The author read about potential migration of animals towards higher altitudes of mountains and to the polar regions in the face of climate change, and thought that this may be a natural experiment for examining possible effects of changes in environmental factors such as temperature and nutrient sources on social behaviours of animals. Interested researchers can expand on the ideas presented. The author wrote the abstract.

Funding

No funding was used in this work.

PeerJ Preprints | https://doi.org/10.7287/peerj.preprints.2696v1 | CC BY 4.0 Open Access | rec: 4 Jan 2017, publ: 4 Jan 2017