William E. Bradshaw and Christina M. Holzapfel. Genetic response to rapid climate change. Center for Ecology and Evolutionary Biology, University of Oregon, USA.

Recent rapid climate warming is affecting primarily winter temperatures. Winters are warming faster than summers and this effect is more pronounced at higher latitudes. As a consequence of warmer winters, spring arrives earlier and fall later than 30-40 years ago, resulting in longer “growing seasons” favorable for growth, development, and reproduction. The longer growing season leads to selection for altered timing of seasonal activities in the life histories of animals. Examples of genetic responses to rapid climate warming span insects, birds and mammals and all can be interpreted as adaptations to earlier springs, longer summers, or later falls; there are no documented cases of genetic shifts in thermal tolerance or thermal optima in any animal population. The majority of temperate animals use the highly predictive length of day as the primary cue to time their seasonal activities. We therefore propose that continued rapid climate warming at temperate and arctic latitudes will impose selection for altered seasonal events, primarily through genetic modification of response to day length, and not through genetic modification of response to temperature, per se.