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Suspending life cycle in the cold: Survival of larval and cyst stages of gordiids (Nematomorpha) to freezing. Erin Rogers¹, Matthew G. Bolek², and Ben Hanelt³ ¹Agricultural Sciences and Natural Resources, Oklahoma State University, Stillwater, Oklahoma, ²Department of Zoology, Oklahoma State University, Stillwater, Oklahoma, and ³Department of Biology, University of New Mexico, Albuquerque, New Mexico.

Horsehair worms are parasites of terrestrial arthropods, but are free-living in aquatic environments as adults. At the end of their parasitic stage, gordiids manipulate the behavior of their arthropod hosts to enter an aquatic environment, where they mate, and reproduce. Females produce millions of eggs that develop into larvae which infect and encyst within a variety of aquatic invertebrates. Some of these infected animals act as transport hosts by carrying cysts to land where they are consumed by crickets. Although gordiids have often been called one of the most understudied groups of animals, recently a number of species are being cultured in our laboratories. However, one set back in maintaining gordiid life cycles in culture is the enormous amount of time needed to rear and maintain the multiple species of hosts for the worms to develop in. Therefore, we explored the possibility of pausing the life cycle of these worms by freezing the larval and cyst stages of two species of North American and African horsehair worms at low temperatures (-80°C). Data from our study suggest that both North American and African hairworm species survive freezing during the larval and cyst stages in water and are infective to their snail and cricket hosts respectively. This ability to withstand freezing is considered an adaptation in some invertebrates to living in cold environments, however it is unclear what advantage the ability to freeze at low temperatures has for gordiids. (Supported by NSF grant number 0949951)