

New study probes impact of climate change on ectotherms

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A new study by biologists at Mercyhurst University focuses on the influence of climate change, particularly warmer winters, on the survival and potential fecundity of cold-blooded animals.

[Cold blooded animals](#), or ectotherms, do not have an internal mechanism for regulating body temperature. Instead, they rely on solar energy captured by the environment.

The purpose of the Mercyhurst study, a collaboration of Michael Elnitsky, Ph.D., assistant professor of biology; and students Drew Spacht and Seth Pezar, is to assess the current and future [impacts of climate change](#) on the overwintering energetics and microenvironmental conditions of the goldenrod gall fly (*Eurosta solidaginis*). Larvae of the goldenrod gall fly have long served as model organisms for studying the strategies used by freeze-tolerant animals for winter survival.

"We used historical temperature data to estimate the overwintering (November through March) energy use of larval gall flies," Elnitsky said. "Based upon the relationship between metabolic rate and temperature, the estimated energy utilization during winter has increased by more than 30 percent over the last 50 years."

Further, with continued climate change, each additional 1 degree C rise in temperature during winter is projected to increase energy use by 12 percent. The consequence of this is that the amount of energy remaining at winter's end directly determines how many offspring the goldenrod

gall fly can produce.

"Unlike some other insects that are benefitting from a [changing climate](#), goldenrod gall fly populations would be predicted to decline," Elnitsky said.

The research team has begun similar assessments of the impacts of a changing [winter climate](#) for other [arthropods](#), such as [deer ticks](#) (*Ixodes scapularis*) that transmit [Lyme disease](#) bacteria and the hemlock woolly adelgid (*Adelges tsugae*), an invasive insect destroying hemlock forests throughout the eastern U.S.

The Mercyhurst group presented their research at the annual meeting of the Entomological Society of America (ESA) in Knoxville, Tenn., last month. Spacht of Erie and Pezar of Madison, Ohio, were awarded the President's Prize in the Physiology, Biochemistry and Toxicology section for their poster presentation. The President's Prize is the award given to the top undergraduate presentation in each section at the conference, which was attended by more than 4,000 scholars.

Provided by Mercyhurst University

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