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As temperatures rise, what happens to red clover?

October 9, 2026



Experimental warming plot equipped with infrared heaters to maintain canopy temperature 3°C above ambient conditions. Photo courtesy of Jim Nelson, University of Kentucky.

Red clover is a widely grown forage crop. Farmers value it for its nutritional value, atmospheric N fixation, and secondary compounds called isoflavones. These compounds can influence animal health, reproduction, and productivity, making red clover an important component of forage-based livestock systems.

But how will future climate change affect this valuable forage crop?

To explore this question, researchers at the University of Kentucky warmed red clover plots by 3°C and added extra rainwater in large events to simulate future climate conditions. The plants were harvested several times during the growing season to mimic hay production. Warmer temperatures reduced red clover forage yield and isoflavone concentrations. Additional rainwater tended to minimize warming-induced negative effects on forage yield but had little effect on isoflavone levels.

These results suggest that future warming may decrease red clover productivity and alter the secondary compounds that contribute to both benefits and risks in livestock systems. As climate continues to change, understanding how important forage crops respond will help farmers make informed management decisions and adapt livestock systems to future environmental conditions.

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Mandal, P., McGrail, R. K., Nelson, J. A., May, J. B., Carlisle, A. E., & McCulley, R. L. (2026). Elevated temperature and increased precipitation alter isoflavone concentrations and biomass of red clover. *Crop Science*, *66*, e70343.

https://doi.org/10.1002/csc2.70343

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