

Statewide Survey of Ticks and Tick-Borne Pathogens

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There is a pressing need to increase tick surveillance in Missouri. The state has a diverse and abundant tick community that is poorly understood, and new human pathogens transmitted by ticks are being discovered. Citizen science is when members of the public collaborate with scientists to collect data and samples. Using citizen science, we can develop information on patterns in tick-borne health issues statewide and simultaneously convert the public from passive recipients of information to active participants in scientific study. A.T. Still University (ATSU) and the Missouri Department of Conservation (MDC) formed a collaboration to develop a comprehensive map that illustrates what tick species are present at the county level and the geographic distribution of what pathogens those ticks are carrying.

This project began in April 2021 and will continue through September 2022. We request participants to enclose ticks that they encounter in zip-locked bags, fill out a simple form, and mail it to ATSU. No personal identifying information is collected. All ticks received are identified and counted, and entered into a database. This database is reflected in a statewide map that depicts the distribution of each tick species on the atsu.edu/ticks webpage. Ten individual adult ticks of each species from each county will be screened for *Borrelia, Ehrlichia, Francisella*, and *Rickettsia* species. Eventually, that same statewide map that depicts each tick



As of September 30th, 12,398 ticks have been submitted, with the Lone star tick being the most common (n=9,089), followed by the American dog tick (n=3,143), blacklegged tick (n=79), and Gulf Coast ticks (n=67). The remaining twenty ticks include the rabbit tick, the brown dog tick, and the bat tick. All but one county has submitted at least one tick. In the first six months, this project has increased the known distribution of the lone star tick by 34% ^{FIG1A}, the American dog tick by 42% ^{FIG1B}, the blacklegged tick by 26% ^{FIG1C}, and the Gulf Coast tick by 8% ^{FIG1D}. We have received two bat ticks which are the fourth report of this species from the state and the first for these locations.



Figure 1. Presence of lone star tick (A), American dog tick (B), blacklegged tick (C), and the Gulf Coast tick (D) by county in the state of Missouri. Tan colored counties are historical documentation of presence, green colored counties are presence determined from this research, and red numbers are the number of ticks received in that county from

Citizen science is an effective technique to accomplish data collection and disease ecology surveillance at a scale unattainable by a limited group of scientists alone. We are very excited and appreciative of participation levels and the support given to us from around the state.



We thank Dyan Pursell and Craig Scroggins for all of their work on the map for the webpage, Amanda Martinez for her assistance with the development of the webpage, Heather Feeler for her assistance with press releases and media requests, and to all of the citizens of Missouri who provided us with tick specimens.

