

UNDERSTANDING TICKS AND TICK-BORNE DISEASES THROUGH AGENT-BASED MODELING

HOLLY GAFF

Tick-borne diseases are on the rise worldwide, and there is a lot of interest to reduce the burden of these diseases. Ticks and tick-borne pathogens are not well studied partly owing to their challenging biology. The dynamics of tick-borne pathogens includes multi-year systems of weather, habitat, and environmental factors plus the availability of hosts required for each life stage. Mathematical models provide an ideal tool to explore this type of complex system by implementing the dynamics that are known and exploring the potential additional components that are less understood. A series of agent-based models will be presented that investigate tick-borne disease dynamics, control, and geographic spread. Each model was based on field and lab data, and the output from each help to identify future experiments.