



North Carolina Forest Service

To protect, manage, and promote forest resources for the citizens of North Carolina

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Publication finds that prescribed burns reduces tick populations

Foresters, biologists, and other natural resource professionals work out in the woods a lot. With that comes the risk of tick bites and exposure to an increasing incidence of tick-borne diseases.

A recent publication in the open access journal PLOS ONE reports that prescribed burning is a cheap and effective method to control ticks and reduce the risk of tick-borne disease. The paper is authored by Elizabeth R. Gleim, Roy D. Berghaus, and Michael J. Yabsle of the University of Georgia; L. Mike Conner of the Jones Ecological Research Center; and Michael L. Levin, and Galina E. Zemtsova of the Centers for Disease Control and Prevention.

The article looks at the effects on tick populations at 21 sites in southwestern Georgia and northwestern Florida that had the presence or absence of a long-term prescribed burning. The burned sites had at least 10 years of burning and unburned ones had at least 10 years of no burning. The authors reported that repeated burns over time significantly reduce ticks. They found that tick counts are effected by long-term burning, season, litter cover, and tree density. They suggest that prescribed fire is a time and cost efficient method to reduce tick populations and likely reduces the risk of tick borne diseases for humans.

Some other results reported:

- The authors suggest that previous studies concluding that tick populations re-populated quickly after a burn did not replicate a real world burn program in that those burns were conducted on small areas, not repeated over time, and on areas with no burn history.
- Researchers found 65x's more adult and nymph stage ticks counted in unburned areas as in to burned areas.
- Ticks are significantly less in burned areas no matter what the time of year, but ticks are 10x's greater in unburned areas in the warm season than the cold.
- A 95% litter cover is associated with a 2-fold increase in tick counts.
- Stands with more than 74 TPA are associated with a 6 x's increase in tick count.

Perhaps, at least according to this study, we can add tick control to the many benefits of prescribed burning.

The entire article is available to read or download at:
<http://dx.doi.org/10.1371/journal.pone.0112174>

The abstract for the publication follows:

“Some tick populations have increased dramatically in the past several decades leading to an increase in the incidence and emergence of tick-borne diseases. Management strategies that can effectively reduce tick populations while better understanding regional tick phenology is needed. One promising management strategy is prescribed burning. However, the efficacy of prescribed burning as a mechanism for tick control is unclear because past studies have provided conflicting data, likely due to a failure of some studies to simulate operational management scenarios and/or account for other predictors of tick abundance. Therefore, our study was conducted to increase knowledge of tick population dynamics relative to long-term prescribed fire management. Furthermore, we targeted a region, southwestern Georgia and northwestern Florida (USA), in which little is known regarding tick dynamics so that basic phenology could be determined. Twenty-one plots with varying burn regimes (burned surrounded by burned [BB], burned surrounded by unburned [BUB], unburned surrounded by burned [UBB], and unburned surrounded by unburned [UBUB]) were sampled monthly for two years while simultaneously collecting data on variables that can affect tick abundance (e.g., host abundance, vegetation structure, and micro- and macro-climatic conditions). In total, 47,185 ticks were collected, of which, 99% were *Amblyomma americanum*, 0.7% were *Ixodes scapularis*, and fewer numbers of *Amblyomma maculatum*, *Ixodes brunneus*, and *Dermacentor variabilis*. Monthly seasonality trends were similar between 2010 and 2011. Long-term prescribed burning consistently and significantly reduced tick counts (overall and specifically for *A. americanum* and *I. scapularis*) regardless of the burn regimes and variables evaluated. Tick species composition varied according to burn regime with *A. americanum* dominating at UBUB, *A. maculatum* at BB, *I. scapularis* at UBB, and a more even composition at BUB. These data indicate that regular prescribed burning is an effective tool for reducing tick populations and ultimately may reduce risk of tick-borne disease.”

Citation:

Gleim ER, Conner LM, Berghaus RD, Levin ML, Zemtsova GE, Yabsley MJ (2014) The Phenology of Ticks and the Effect of Long-Term Prescribed Burning on Tick Population Dynamics in Southwestern Georgia and Northwestern Florida. PLOS ONE 9(11): e112174. doi:10.1371/journal.pone.0112174