

# Mound Densities of Red Imported Fire Ants Associated with Gopher Tortoise Burrows on Private and Public Forest Lands in Mississippi

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*Abstract:* Many studies have reported that imported fire ants can have negative impacts to property, wildlife, and ecosystem integrity. Depredation by fire ants can reduce native insect diversity and survival of hatchling birds and reptiles, including gopher tortoises. Because of the potential impacts of fire ants on gopher tortoise recruitment, we assessed infestation levels of red imported fire ants on public and private forest lands in south Mississippi. Our study design focused on surveys for estimation of densities of fire ant mounds on suitable and priority soils for gopher tortoises. We surveyed 16 land bases and five forest cover types during summer 2010. Forest cover types included in our study were planted longleaf and loblolly pine  $\leq 5$  years of age, planted longleaf pine  $>5$  to  $\leq 15$  years of age, longleaf and loblolly pine forests  $>15$  years of age, and mixed pine hardwood forests  $>15$  years of age. Circular plots measuring 40 m in diameter were established for mound density estimation at active burrows of gopher tortoises and non-burrow locations within the afore-listed cover types. A total of 382 circular plots were surveyed with 148 sample points being monitored at active tortoise burrows and 234 sample points monitored at non-burrow locations. In addition to fire ant mound counts within each plot, we measured bare ground and leaf litter characteristics, edaphic features, and composition and percent coverage of ground, midstory, and overstory vegetation. Mound densities ranged from 15 mounds/ha on closed canopy, mixed pine forests to 175 mounds/ha on open canopy longleaf pine forests. Mound densities differed significantly among forest cover types with longleaf pine forests on sandhill soil types exhibiting the greatest mound densities at burrow and non-burrow locations. Mound densities were greater at active burrow locations than non-burrow locations on planted longleaf and loblolly pine  $\leq 5$  years of age, longleaf pine forests  $>5$  to  $\leq 15$  years of age, and longleaf-loblolly pine forests  $>15$  years of age ( $P < 0.001$ ). Fire ant mound densities were typically lower in closed canopy mixed pine forests. In contrast, regularly burned, open canopy, longleaf pine forests located on priority soils for gopher tortoises exhibited the greatest mound densities among all study sites. Our results indicated that infestations of red imported fire ants are widespread on public and private forestlands in south Mississippi. Areas being managed for longleaf pine restoration and habitat enhancement for gopher tortoises exhibited the greatest densities of fire ant mounds. Due to reported impacts of fire ant depredation on survival of tortoise hatchlings, we recommend implementation of monitoring and control of imported fire ants in areas targeted for gopher tortoise augmentation. This approach is especially important on areas where gopher tortoises will be introduced for conservation and mitigation banking. However, chemical control should be approached cautiously on sites occupied by tortoises due to reported impacts of selected pesticide ingredients on young birds and reptiles.

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