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Authors: Kintz-Early, Janet, Parris, Leslie, Zettler, Jennifer, and Bast, Josh

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EVIDENCE OF POLYGYNOUS RED IMPORTED FIRE ANTS (HYMENOPTERA: FORMICIDAE) IN SOUTH CAROLINA

JANET KINTZ-EARLY¹, LESLIE PARRIS², JENNIFER ZETTLER³ AND JOSH BAST⁴

¹Department of Entomology, Clemson University, Clemson SC 29634

²Department of Wildlife and Fisheries, Clemson University, Clemson, SC 29634

³Department of Biology, Armstrong Atlantic State University, Savannah, GA 31419

⁴1000 E. First St., Sanford, FL 32771

Polygynous red imported fire ant populations have the potential for greater economic and environmental damage than the monogyne form because polygyne mound and population densities are two to three times greater than monogyne mound and population densities (Lofgren & Williams 1984; Vinson & Sorensen 1986; Porter 1992; Macom & Porter 1996). In addition to polygyne mound diameters being slightly smaller than monogyne mounds (Porter 1992), polygynous workers are smaller, lighter in color, and less aggressive toward neighboring mounds. Polygyne queens lay fewer eggs, weigh less than monogyne queens (Greenberg et al. 1985), and produce fewer reproductives (Vinson & Sorensen 1986). Polygynous colonies reproduce both via mating flights and budding but reproduce primarily by budding (Vargo & Porter 1989). Polygynous colonies, due to their abundance and competitive pressure, have a greater capacity to eliminate arthropods, including native ant species (Porter & Savignano 1990), plants, and vertebrates (Porter et al. 1991). The purpose of this study is to document the overall presence of polygynous colonies of *S. invicta* in the state of South Carolina. This information may be used to improve the effectiveness of red imported fire ant management because polygyny may affect the type and duration of control needed and pesticide application rates (Porter et al. 1991).

Seven counties across five edaphic regions of South Carolina (Blue Ridge, Piedmont, Southeastern Plains, Middle Atlantic Coastal Plains and Southern Coastal Plains) were evaluated during the fall of 1999 and spring of 2000 for the likelihood of possessing polygynous red imported fire ant colonies. *S. invicta* queens were collected from roadsides and pastures in five South Carolina counties (Pickens, Anderson, Aiken, Richland, and Beaufort) using high mound densities (200+ mounds/ha) as an indicator of polygyny. Horry and Colleton counties were also surveyed but mound densities were too low to suspect polygynous colonies were established there.

Two to six colonies were sampled from each site suspected of polygyny. Queens were collected from the surface of overturned mounds or by excavating colonies. Excavated colonies were placed

into 18.9-L buckets with a 7.6-cm Fluon® band at the top. The drip-flotation method was used to remove queens from the soil (Banks et al. 1981). All red imported fire ant queens were stored in 70% alcohol until they were dissected to confirm that each queen had mated and established within the colony. Dissection was completed using the technique of Glancey et al. (1973) to identify the presence of both an enlarged sperm-filled spermatheca and degenerated wing muscles. In colonies with multiple dealates, up to five randomly selected queens were dissected.

This study shows polygynous red imported fire ants are present in South Carolina (Fig. 1). Beaufort was the only county sampled that did not have multiple inseminated queens. Out of the remaining fifteen colonies sampled from four counties, thirteen colonies from a total of four counties (Pickens, Anderson, Aiken and Richland) had multiple inseminated queens with degenerated

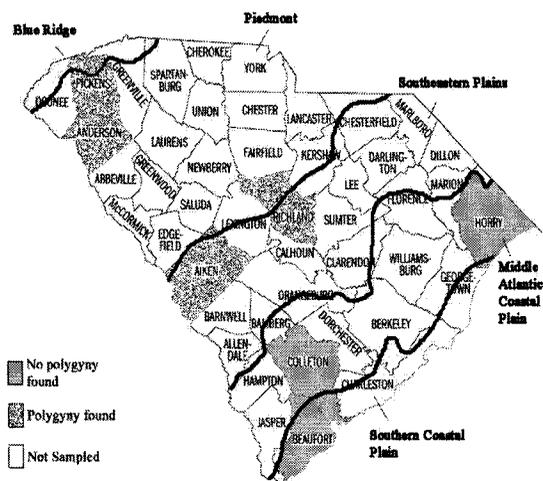


Fig. 1. South Carolina map showing counties sampled for polygynous red imported fire ant colonies. Counties in the Blue Ridge, Piedmont and southeastern plains had polygynous colonies while only monogynous colonies appeared to be in the Middle Atlantic and southern Coastal Plains counties. This map is adapted from an EPA ecoregion map and the U.S. census county map.

wing muscles. At the time of sampling, our results indicated polygyny was found in the Blue Ridge, Piedmont and southeastern plains of South Carolina. Observations in two coastal counties suggested that polygyne red imported fire ant may not be present in the Middle Atlantic or southern coastal plains. Further study is warranted to determine the extent of polygyny throughout the state of South Carolina.

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SUMMARY

Polygynous red imported fire ant colonies were found in the western and central regions of South Carolina. Additional studies should be conducted to more precisely determine the extent of polygyny in the state of South Carolina.

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