# NOTE

# Densities of Monogynous Red Imported Fire Ant (Hymenoptera: Formicidae) Colonies in Georgia Pastures[1]

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The red imported fire ant, *Solenopsis invicta* Buren, entered the United States in the 1930s from South America (Wilson, 1959, Nat. Hist. 68: 276-281). Since then, the red imported fire ant has spread to 12 southern states and Puerto Rico. Its natural spread (mating flights) has been greatly augmented by man through the transport of queens and colonies via the shipment of sod and nursery stock (Markin et al. 1971. J. Ga. Entomol. Soc. 6: 145-156). As red imported fire ants move into an area, colonies are established in large numbers. However, competition for resources such as food and nest sites causes a decline in the number of colonies within a couple of years (Lofgren et al. 1975. Annu. Rev. Entomol. 20: 1-30). This level remains relatively stable with minor fluctuations resulting from the death of old colonies and the establishment of new colonies. Polygynous colony densities have been reported as high as 640 to 2000 per ha (Lofgren and Williams 1984. Fla. Entomol. 67: 484-486; Glancy and Lofgren. 1988. Fla. Entomol. 71 (4): 581-587): monogynous densities have been reported to average from 48 active colonies per ha to 250 active colonies per ha (Morrill. 1974. Environ. Entomol. 3: 265-271; Lofgren. 1986. *In* Fire Ants and Leaf Cutting Ants: Biology and Management. Westview Press, Boulder, CO). This study augments earlier published estimations of imported fire ant colony densities with empirical data.

Eighteen counties in Georgia were surveyed during the summer of 1993. The counties chosen for the study were found in the three major edaphic divisions in the state; the Southern Piedmont, the Southern Coastal Plain, and the Atlantic Coast Flatlands. Six counties were located in each of the three regions. County extension personnel were contacted in each county and asked to locate three bahiagrass fields to be used in a soil and insect survey. The extension personnel were not given details of the survey so they would not be influenced to find a field heavily populated with imported fire ants. The extension personnel

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selected 41 grazed pastures and 13 hay fields for the survey. Five 0.07-ha plots were established diagonally across each field. Active colony density counts were taken within each plot by disturbing all of the mounds in the plot and recording the number of colonies exhibiting a defensive behavior. Counties known to contain polygynous colonies were excluded from the survey. However, polygynous colonies were found during the survey. The extension personnel were asked to select replacement fields.

The results from the 270 sites indicate an average of 66.6 active colonies per ha throughout the state (Fig. 1). Red imported fire ant colony densities in individual fields ranged from 0 to 213.9 active colonies per ha. The results indicate relatively equal densities throughout the state, regardless of soil region. The Southern Piedmont region had a range of 21.4 to 213.9 with an average of 68.3 active colonies per ha. The Southern Coastal Plain had a range of 0 to 189.4 with an average of 67.3 active colonies per ha, and the Atlantic Coast Flatlands had a range of 0 to 120.0 with an average of 64.2 active colonies per ha. Analysis of variance showed that the average number of active colonies did not differ among regions [($F = 0.04$; df = 2, 15; $P = 0.08$) Sas Institute Inc. 1989 SAS/STAT User's Guide, ver. 6, 4th ed, vol. 1, Cary, NC. 943 pp.] The number of inactive mounds in the plots was not recorded in this study. However, in a separate study conducted in 1993, 47% of 213 marked mounds were shown to be inactive (unpublished data).

Similar densities were recorded in the grazed pastures and hay fields. The pastures averaged 68.2 active colonies per ha with a range of 0 to 213.9 colonies, and the hay fields averaged 64.3 active colonies per ha with a range of 0 to 189.4 colonies (Fig. 1). The analysis of variance showed that the average number of active colonies in the two habitats was not significantly different [($F = 0.28$; df = 1, 25; $P = 0.9$) SAS Institute 1989 SAS/STAT User's Guide, ver. 6, 4th ed., vol. 1, Cary, NC. 943-pp.].

Of the 56 fields randomly selected by Extension personnel, two (3.6%) contained polygynous colonies. These two fields were in counties where the presence of polygynous fire ants had not been reported previously.

Casual observation of red imported fire ant colonies in any pasture or hay field in Georgia might lead to an estimate of over 100 active colonies per ha. However, only 10 (18.5%) of the fields in this study contained > 100 active colonies per ha. When examined for activity, many of the mounds present in fields are found to be inactive. These facts are significant for at least two reasons. First, there may not be as many imported fire ants as have been reported. The infested areas are totally saturated; however, when extrapolating figures such as the number of sexuals produced per ha or the economic damage caused by the red imported fire ant, it is necessary to get an accurate count of active colonies in the affected area. Second, there may be more inactive mounds per ha than is generally realized. This is important considering the damage caused to mowers and other equipment by the hard mounds of dirt. The above ground portion of a mound of an active colony is frequently reworked by the reserves. Inactive mounds are not reworked and tend to crust over, causing more equipment damage than the mounds of active colonies.

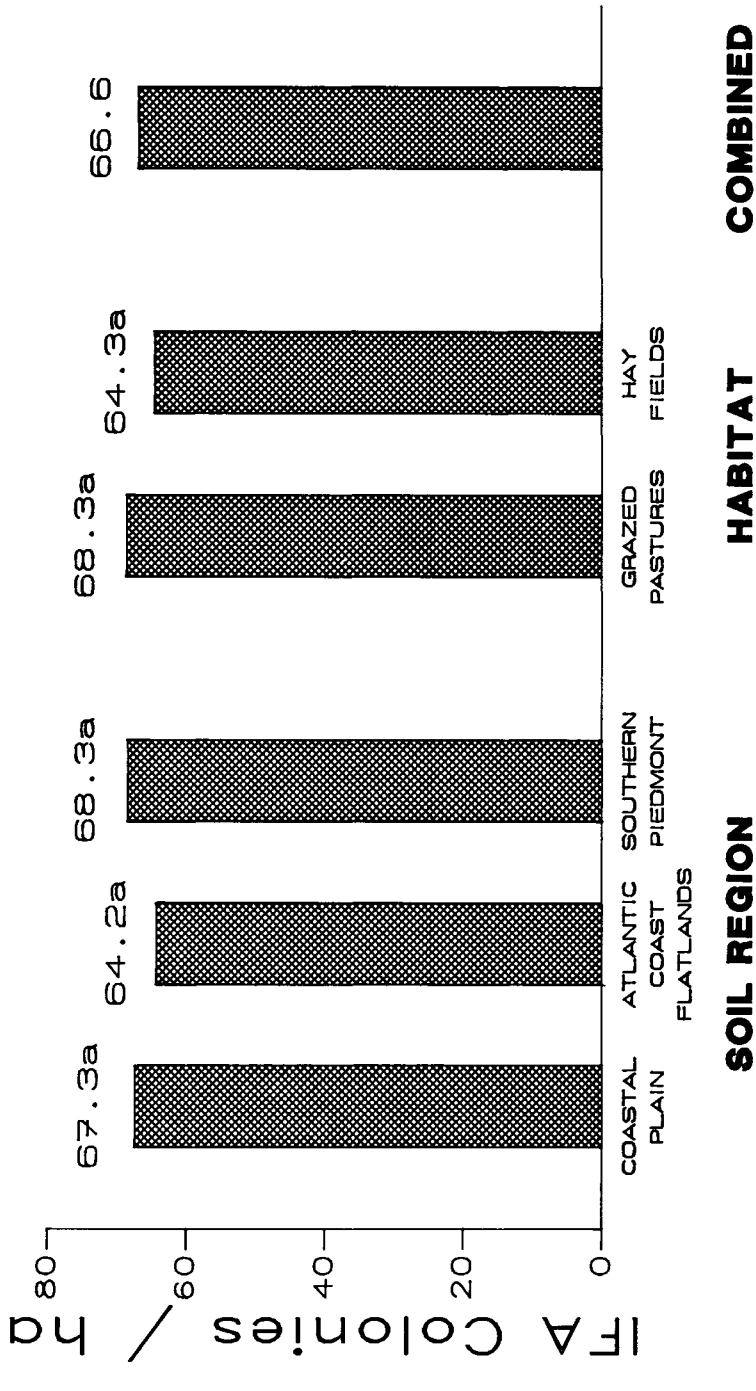


Fig. 1. Number per ha of active imported fire ant colonies in Georgia.