DISPERSAL OF RED IMPORTED FIRE ANTS
BY WATER\textsuperscript{1,2}

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ABSTRACT

Male and female \textit{Solenopsis invicta} Buren were found on a lake surface
after a nuptial flight, and after another flight, dealate females believed to have
drifted from the lake surface were seen constructing brood chambers on the
shore. High numbers of alate and dealate female ants were found on a log jam
on a river. These ants had a high rate of mortality in the laboratory, possibly
due to a fungus infection resulting from wet conditions encountered while on
the river. Clumps of ants from mounds submerged during floods were found on
a lake and river. Some of these clumps of ants contained queens. Rivers may be
important in spreading ants from infested into uninfested areas.

The spread of \textit{Solenopsis invicta} Buren usually occurs during nuptial
flights (Markin et al. 1971). In addition, rivers may play a role in the spread of
this ant, for during flooding, ants may desert submerging mounds, form a ball,
and float away (Green and Hutchins 1960). Possibly these floating clusters of
ants could establish new colonies downstream. Kannowski (1971) found
numbers of dead alate ants washed ashore after nuptial flights. During 1972
and 1973 I investigated the possibility of living fertile females and complete
colonies being distributed by rivers and lakes.

During a small localized flight of \textit{S. invicta} in late May 1972, the surface of
Lake Talquin (Gadsden Co., Florida), was inspected from a canoe. In an hour,
64 male and 37 female alate ants were found. The ants were upright, upside
down, or on their sides in the water. All of the ants were alive; none had broken
off their wings as they do after descending to the land. Distribution of the ants
was not random, for at times as many as 6 could be seen at one time (they were
visible for ca 15 m) and at times none could be seen. Although fish were feeding
on surface material, none were seen taking ants. A rainstorm moved into the
area, and the inspection was terminated. Wave action caused by the storm
resulted in many of the ants breaking through the water surface and
presumably drowning. A single wet alate female was found washed ashore.

After a later flight, many \textit{S. invicta} and mated females of several other
species were found constructing brood chambers on a narrow strip of sand on
the lake shore. Although some of the ants may have descended directly onto
the sand at the conclusion of the flights, the high numbers suggested that
many had floated to the shore. Heavy deposits of dead chironomids were also
seen in the beach drift.

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After hearing of handful of alate female *S. invicta* being found on a wooden jetty near a dam through which Lake Talquin overflows into the Ocklockonee River, I inspected log jams (Fig. 1 A) in the river and found about 2,000 alate and dealate *S. invicta* females in one location. Ants were in crevices in logs, under bark, and clinging to log surfaces (Fig. 1 B, C). Some eggs were present, but there were no other brood stages.

![Image](https://example.com/image1)

![Image](https://example.com/image2)

**Fig. 1.** (A) Log jam on Ocklockonee River (Liberty Co.) Florida; (B) handful of dealate *Solenopsis invicta* collected from logs; (C) groups of ants on logs.

A sample of the ants was taken to the laboratory, and 25 were held in groups of 5 in 1 oz. paper cups containing 1/4 oz. of plaster of Paris. Cups were held at 82°F, and water was added as necessary to prevent desiccation of the females and their brood. After 14 days, 50% of the ants had died. Only one survived until workers were produced. At the same time, ants which had flown, mated, and descended to the ground were held under the same conditions. After 28 days, 68% of these ants were still alive, and workers were produced in all cups. Usually when there was more than one queen in a cup, the queens would fight after the workers were produced, and only one queen survived.
The high mortality of the ants collected on the river is believed due to fungal attack, for fungal mycelia appeared on the ants soon after death. When newly mated queens were held under saturated conditions similar to those found in the water-soaked logs, none survived. When canopies develop in infested fields which have been replanted or grow back to trees, *S. invicta* colonies are not able to survive. Perhaps the shade and high relative humidity encourage fungal growth; mounds are built higher under these conditions. The construction of the mound provides a gradient of temperature and humidity under usual conditions (Green 1952).

After heavy rains in April 1973, several lakes and rivers were examined for clumps of ants which might have escaped from submerged mounds. Clumps of ants were found on Lake Iamonia (Leon Co., Florida). Flooding had begun 14 days before the search, and it is believed the ants had been on the surface since flooding began. The clumps of ants had floated into weeds and shrubs which protruded above the water (Fig. 2 B). Eleven clumps of 600-5,400 ants were collected in plastic bags, frozen, and examined. Mated queens were found in 2 clumps. The clumps were easily fragmented during collection, and it is likely that workers from a single colony had divided into several groups after leaving the mound. None of the clumps collected from the lake surface contained brood, but brood and alate females were found in a clump of ants which had moved up on a tree trunk (Fig. 2 A). Possibly after 2 weeks, the brood in the other clumps had died and been discarded or had been eaten.

Fig. 2. (A) Mass of *Solenopsis invicta* workers, brood, and alate forms accumulated on tree trunk after a flood; (B) clump of ants attached to shrub after a flood.

During this time of flooding, a large dish-shaped clump of ants was found floating down the Suwannee River (Suwannee Co.). The clump was ca 45 cm in diameter, and brood was visible in its center (personal communication with
C. F. Zeigler, Box 4970, Jacksonville, Fla. 32201). This river flows in a general north to south direction, or in the same direction as the spread of the red imported fire ant in Florida.

Unless a lake is unusually large and extends from infested to uninfested land, it would be unimportant in spreading ants. However rivers may carry mated females or (during floods) entire colonies downstream.

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LITERATURE CITED


