

THE RED IMPORTED FIRE ANT, SOLENOPSIS INVICTA, IN THE VIRGIN ISLANDS (HYMENOPTERA: FORMICIDAE)

Authors: Wetterer, James K., and Snelling, Roy R.

Source: Florida Entomologist, 89(4) : 431-434

Published By: Florida Entomological Society

URL: [https://doi.org/10.1653/0015-4040\(2006\)89\[431:TRIFAS\]2.0.CO;2](https://doi.org/10.1653/0015-4040(2006)89[431:TRIFAS]2.0.CO;2)

BioOne Complete (complete.BioOne.org) is a full-text database of 200 subscribed and open-access titles in the biological, ecological, and environmental sciences published by nonprofit societies, associations, museums, institutions, and presses.

Your use of this PDF, the BioOne Complete website, and all posted and associated content indicates your acceptance of BioOne's Terms of Use, available at www.bioone.org/terms-of-use.

Usage of BioOne Complete content is strictly limited to personal, educational, and non - commercial use. Commercial inquiries or rights and permissions requests should be directed to the individual publisher as copyright holder.

BioOne sees sustainable scholarly publishing as an inherently collaborative enterprise connecting authors, nonprofit publishers, academic institutions, research libraries, and research funders in the common goal of maximizing access to critical research.

THE RED IMPORTED FIRE ANT, *SOLENOPSIS INVICTA*, IN THE VIRGIN ISLANDS (HYMENOPTERA: FORMICIDAE)

JAMES K. WETTERER¹ AND ROY R. SNELLING²

¹Wilkes Honors College, Florida Atlantic University, 5353 Parkside Dr., Jupiter, FL 33458

²Natural History Museum of Los Angeles County, 900 Exposition Blvd., Los Angeles, CA 90007

ABSTRACT

The best known and most destructive exotic ant species in the US is the red imported fire ant, *Solenopsis invicta* Buren. Recently, this species has been reported from several islands in the West Indies, including St. Croix, US Virgin Islands (USVI) and Guana Island, British Virgin Islands (BVI). In the present study, we report new records of *S. invicta* on St. Croix (13 sites) and the first records of *S. invicta* from 3 other of the Virgin Islands: St. Thomas, USVI (7 sites), St. John, USVI (2 sites), and Tortola, BVI (6 sites). *Solenopsis invicta* appears to be well established in disturbed open environments on all 4 islands. It is important that people in the Virgin Islands and elsewhere in the West Indies, particularly healthcare professionals, are aware of the presence of *S. invicta*, can recognize the symptoms of *S. invicta* stings, and know proper treatments for adverse reactions to the stings, including rare but potentially deadly anaphylactic shock.

Key Words: exotic species, fire ants, *Solenopsis invicta*. Virgin Islands, West Indies

RESUMEN

La especie de la hormiga exótica mejor conocida y muy destructiva en los EEUU es la importada hormiga roja del fuego, *Solenopsis invicta*. Esta especie se ha sido reportado recientemente en varias islas en las Antillas, inclusive S. Croix, las Islas Virgenes de EEUU (USVI) y la Isla de Guana, las Islas Virgenes inglesas (BVI). En el estudio presente, nosotros reportamos nuevos registros de *S. invicta* en el S. Croix (13 sitios) y los primeros registros de *S. invicta* de tres otras de las Islas Virgenes: S. Thomas, USVI (7 sitios), S. John, USVI (2 sitios), y Tortola, BVI (6 sitios). *Solenopsis invicta* aparece ser establecido bien en ambientes abiertos perturbados en las cuatro islas. Es importante que personas en las Islas Virgenes y en otras partes en las Antillas, particularmente profesionales de cuidado medico, están avisado de la presencia de *S. invicta*. Estos profesionales deben de reconocer los síntomas de la picada de *S. invicta*, y saber los tratamientos para reacciones adversas a la picada.

Translation provided by the authors.

The best known and most destructive exotic ant species in the US is the red imported fire ant, *Solenopsis invicta* Buren, which arrived in Alabama by ship from South America sometime before 1945 (Buren et al. 1974). Since then, this predatory ant has spread across the US from Texas to North Carolina in the southeast and California in the west, particularly in open disturbed areas, causing ecological and economic damage (e.g., see Tschinkel 1988, 1993; Allen et al. 2004; Wetterer & Moore 2005). *Solenopsis invicta* is well-known for its powerful sting, which causes a burning sensation in humans, usually followed within one or two days by the appearance of a white pustule. These pustules are diagnostic for the stings of *S. invicta* and other *Solenopsis saevissima* complex fire ants from South America (S. Porter, pers. comm.). The stings of other ants, including the widespread tropical fire ant, *Solenopsis geminata* (Fabricius), do not produce pustules.

The venom has hemolytic and neurotoxic properties and may cause allergic responses and result in secondary infections, sepsis, anaphylactic shock, and even death (Prahlow & Barnard 1998; deShazo et al. 2004).

The earliest known West Indian records of *S. invicta* are from Puerto Rico (Buren 1982), where it is now widespread (Torres & Snelling 1997; Davis et al. 2001; RRS & JKW, unpublished data). More recently, *S. invicta* has been reported from numerous other islands in the West Indies (Table 1), including the Virgin Islands, which lie to the east of Puerto Rico. Davis et al. (2001) published records of *S. invicta* from St. Croix, US Virgin Islands (in 1997: Fredensborg National Guard facility, and in 2000; Route 66, 0.8 km east of Route 663) and from Guana Island, a small island north of Tortola, British Virgin Islands (BVI, in 1996). *Solenopsis invicta* closely resembles *S. geminata*, both in appearance and in the pain of its sting.

TABLE 1. EARLIEST KNOWN SPECIMEN RECORDS FOR *SOLENOPSIS INVICTA* ON ISLANDS OF THE WEST INDIES. THE ASTERISK (*) INDICATES DATE PROVIDED BY M. DEYRUP.

Island	Year	Source reference
Puerto Rico	1981	Buren 1982
St. Croix, USVI	1988	present study
San Salvador, Bahamas	1993*	Deyrup 1994
New Providence, Bahamas	1995*	Deyrup et al. 1998
North Andros, Bahamas	1996*	Deyrup et al. 1998
Guana Island, BVI	1996	Davis et al. 2001
Gorda Cay, Bahamas	1997	Davis et al. 2001
Antigua	2000	Davis et al. 2001
Abaco, Bahamas	2000	Davis et al. 2001
Trinidad	2000	Davis et al. 2001
Grand Bahama, Bahamas	2000	Davis et al. 2001
Providenciales, Turks & Caicos	2001	Davis et al. 2001
Berry Islands, Bahamas	2005	M. Deyrup, pers. comm.
St. Thomas, USVI	2005	present study
St. John, USVI	2005	present study
Tortola, BVI	2005	present study

Because *S. geminata* is common throughout the West Indies, the presence of *S. invicta* may be easily overlooked, even by trained entomologists.

In the present study, we examined museum specimens and made field collections to evaluate the distribution of *S. invicta* in the Virgin Islands.

METHODS

JKW searched the ant collection at the US National Museum (USNM) for *Solenopsis invicta* specimens from the Virgin Islands. Between Oct 1991 and Oct 2002, RRS collected ants on Guana Island during several visits (see Snelling 1993, 2003).

From 30 Oct to 21 Nov 2005, JKW collected ants on the 4 largest of the Virgin Islands, the 3 main islands of the US Virgin Islands (St. Croix - 7 d, St. Thomas - 5.5 d, and St. John - 4.5 d), and the main island of the British Virgin Islands (Tortola - 4.5 d). Collection sites included a diversity of disturbed and relatively natural habitats from the coastlines to the mountaintops. We also made a number of other observations concerning *S. invicta* in the Virgin Islands.

RESULTS

The USNM collection had *Solenopsis invicta* specimens from 2 sites in the Virgin Islands, both from St. Croix in 1988: Kingshill and Concordia. These records are earlier than any published records from the Virgin Islands.

RRS did not find *S. invicta* on Guana Island prior to 1996. In Oct 2002, *S. invicta* was common on the south side of the island: on the playa behind White Beach and in the “plantation” area. Forested areas of Guana Island were occupied by *Solenopsis geminata*.

In 2005, JKW collected *S. invicta* from 28 sites in the Virgin Islands: St. Croix (13 sites), St. Thomas (7 sites), St. John (2 sites), and Tortola (6 sites). All sites were in highly disturbed habitats, primarily open grassy areas (Table 2). All sites except one were low elevation (<100 m above sea level; the site at Parasol, St. Croix was 200 m above sea level). JKW collected *S. geminata* at 83 sites in the Virgin Islands: St. Croix (23 sites), St. Thomas (19 sites), St. John (23 sites), and Tortola (18 sites), in a wide variety of disturbed and relatively undisturbed habitats at all elevations.

On St. Croix, Jozef (Jeff) Keularts, an entomologist with the US Cooperative Extension Service, was aware of the presence of *S. invicta* on St. Croix. Lesley Hoffman, Administrative Director at the St. George Village Botanical Garden, St. Croix, related that in Jan 2005, her husband, Robert Hoffman, was stung by *S. invicta* while golfing at the Buccaneer Hotel Golf Course on St. Croix. He was brought to Juan Luis Hospital, where he was treated for anaphylactic shock with adrenaline and antihistamines. He now always carries an auto-injection charged with epinephrine because he was told that a subsequent attack could cause even more severe anaphylactic shock, which could be fatal without immediate treatment. Once stung the body builds up antibodies and subsequent attacks can result in potentially deadly allergic reactions.

On St. Thomas, George Ralish, the superintendent at Mahogany Run Golf Course knew of the presence and threat of *S. invicta* on the course. He has been working to control *S. invicta* on the golf course through spot treatment of nests using two insecticides (Extinguish from Wellmark, active ingredient = 0.5% Methoprene; Varsity from Syngenta, active ingredient = 0.011% Abamectin).

TABLE 2. NEW COLLECTION SITES OF *SOLENOPSIS INVICTA* IN THE VIRGIN ISLANDS (30 OCT TO 21 NOV 2005).

°N	°W	Island	Site	Habitat
17.780	64.770	St. Croix	Salt River, entrance to Gentle Winds	grass lawn
17.759	64.586	St. Croix	Cramer's Park	grass & weeds
17.757	64.817	St. Croix	Parasol; Scenic Dr., 0.5 km E of Rte. 69	grass & weeds
17.740	64.842	St. Croix	Montpellier, by church	grass lawn
17.732	64.813	St. Croix	Upper Love, by church	grass lawn
17.729	64.865	St. Croix	Little La Grange, by Lawaetz Museum	grass lawn
17.720	64.798	St. Croix	Kingshill, UVI	by parking lot
17.717	64.694	St. Croix	Longford, Routes 62 & 85	grass lawn
17.715	64.883	St. Croix	Fredriksted, waterfront park	plantings
17.715	64.830	St. Croix	St George, Botanical Garden	grass lawn
17.702	64.885	St. Croix	Smithfield, south of Cottages by the Sea	grass lawn
17.694	64.891	St. Croix	Hesselberg, south end of Shore Drive	grass lawn
17.694	64.820	St. Croix	Betty's Hope, south of Route 64	scrub forest
18.364	64.923	St. Thomas	Magens Bay, end of Route 35	beach weeds
18.359	64.906	St. Thomas	Lovenlund, Mahogany Run Golf Course	grass green
18.344	64.974	St. Thomas	John Brewer's Bay, UVI	by parking lot
18.344	64.937	St. Thomas	Charlotte Amalie, Griffiths Park	grass & weeds
18.344	64.933	St. Thomas	Charlotte Amalie, Creques Alleys	plantings
18.344	64.930	St. Thomas	Charlotte Amalie, Emancipation Garden	grass lawn
18.339	64.969	St. Thomas	Brewer's Bay, airport	plantings
18.348	64.713	St. John	Coral Bay	baseball field
18.343	64.785	St. John	Caneel Bay, resort	grass lawn
18.447	64.562	Tortola	Josiah's Bay, by hostel	grass lawn
18.425	64.619	Tortola	Road Town, waterfront	weeds
18.425	64.579	Tortola	Paraquita Bay, community college	grass lawn
18.414	64.589	Tortola	Brandy Wine Bay	beach weeds
18.412	64.671	Tortola	Carrot Bay	beach weeds
18.386	64.699	Tortola	Sandy Point, boat yard	grass & weeds

On St. John, the US quarantine office in the main harbor at Cruz Bay had no records of any ants intercepted from in-coming cargo. The personnel there were unaware of any threat posed by pest ant species, including *S. invicta*.

On Tortola, a person visiting a beach complained of white pustules and scars from ant stings he received while working at a boat yard at the Sandy Point. JKW found this entire boat yard heavily infested with *S. invicta*.

DISCUSSION

In the Virgin Islands, *Solenopsis invicta* is now well established on all 4 major islands as well as on Guana Island. Based on specimen records, it appears that *S. invicta* probably arrived in the Virgin Islands in the 1980s, first establishing itself on St. Croix. The first populations of *S. invicta* on the other Virgin Islands may be quite recent, dating from the 1990s and later. It is not surprising that *S. invicta* has spread to St. Croix and the other Virgin Islands, given the large amount of commercial ship traffic to these islands from Puerto Rico and ports in the southeastern US, sites which are heavily

infested with *S. invicta*. It seems inevitable that *S. invicta* will soon spread to most other populated islands of the West Indies as well.

Solenopsis invicta poses an important threat not only to terrestrial invertebrates in the Virgin Islands and other West Indian islands, but also to vertebrates. For example, *S. invicta* attacks and kills hatchling sea turtles in Florida (Allen et al. 2001; Parris et al. 2002; Krahe et al. 2003; Krahe 2005), and may pose a similar hazard to sea turtles in the Virgin Islands. The collection site in southwestern Hesselberg, St. Croix, was adjacent to the Sandy Point Wildlife Preserve, an important nesting beach for the endangered leatherback sea turtle, *Dermochelys coriacea* (Vandelli) (Dutton et al. 2005). *Solenopsis invicta* may also represent a threat to already endangered small vertebrates on these islands, including many species of *Anolis* lizards. Finally, it is important that people in the Virgin Islands, particularly healthcare professionals, are aware of the threat of *S. invicta* to humans, can recognize the symptoms of *S. invicta* stings, and know proper treatments for severe adverse reactions to the stings, including rare but potentially deadly anaphylactic shock.

ACKNOWLEDGMENTS

We thank A. Wetterer, M. Wetterer, S. Porter, and M. Lachance for comments on this manuscript; the National Science Foundation, Florida Atlantic University, and the Natural History Museum of Los Angeles County for financial support.

REFERENCES CITED

- ALLEN, C. R., E. A. FORYS, K. G. RICE, AND D. P. WOJCIK. 2001. Effects of fire ants on hatching sea turtles and the prevalence of fire ants on sea turtle nesting beaches in Florida. *Florida Entomol.* 84: 250-253.
- ALLEN, C. R., D. M. EPPERSON, AND A. S. GARMESTANI. 2004. Red imported fire ant impacts on wildlife: A decade of research. *American Midl. Nat.* 152: 88-103.
- BUREN, W. F., G. E. ALLEN, W. H. WHITCOMB, F. E. LERNARTZ, AND R. N. WILLIAMS. 1974. Zoogeography of the imported fire ants. *J. New York Entomol. Soc.* 82: 113-124.
- BUREN, W. F. 1982. Red imported fire ant now in Puerto Rico. *Florida Entomol.* 65: 188-189.
- DAVIS, L. R., JR., R. K. VANDER MEER, AND S. D. PORTER. 2001. Red imported fire ants expand their range across the West Indies. *Florida Entomol.* 84: 735-736.
- DESHAZO, R. D., S. F. KEMP, M. D. DESHAZO, AND J. GODDARD. 2004. Fire ant attacks on patients in nursing homes: an increasing problem. *Am. J. Med.* 116: 843-846.
- DEYRUP, M. 1994. Biogeographical survey of the ants of the island of San Salvador, Bahamas, pp. 21-28 *In* Proc. 5th Symp. Nat. Hist. Bahamas, Bahamian Field Sta., San Salvador, Bahamas.
- DEYRUP, M., L. DAVIS, AND S. BUCKNER. 1998. Composition of the ant fauna of three Bahamian islands, pp. 23-31 *In* Proc. 7th Symp. Nat. Hist. Bahamas, Bahamian Field Sta., San Salvador, Bahamas.
- DUTTON, D. L., P. H. DUTTON, M. CHALOUPKA, AND R. H. BOULON. 2005. Increase of a Caribbean leatherback turtle *Dermochelys coriacea* nesting population linked to long-term nest protection. *Biol. Conserv.* 126: 186-194.
- KRAHE, H. B. 2005. Impact of the red imported fire ant (*Solenopsis invicta*) on two species of sea turtle hatchlings. M.S. Thesis, Florida Atlantic Univ., 42 pp.
- KRAHE, H., J. K. WETTERER, AND L. D. WOOD. 2003. Impact of fire ant stings on sea turtle hatchling survival, pp. 211-212 *In* Proc. 22nd Ann. Symp. Sea Turtle Biol. Conserv., NOAA Tech. Mem. NMFS-SEFSC 503.
- PARRIS, L. B., M. M. LAMONT, AND R. R. CATHY. 2002. Increased incidence of red imported fire ant (Hymenoptera: Formicidae) presence in loggerhead sea turtle (Testudines: Cheloniidae) nests and observations of hatchling mortality. *Florida Entomol.* 85: 514-517.
- PRAHLOW, J. A., AND J. J. BARNARD. 1998. Fatal anaphylaxis due to fire ant stings. *Amer. J. Forensic Med. Pathol.* 19: 137-142.
- SNELLING, R. 1993. Ants of Guana Island, British Virgin Islands. Notes from Underground 8: 10-11.
- SNELLING, R. 2003. Collecting trip to Guana Island, Oct 2002. Notes from Underground 9: <http://www.notesfromunderground.org/archive/vol912/mainpagearchive1.html>.
- TORRES, J. A., AND R. R. SNELLING. 1997. Biogeography of Puerto Rican ants: a non-equilibrium case? *Biodivers. Conserv.* 6:1103-1121.
- TSCHINKEL, W. R. 1988. Distribution of fire ants *Solenopsis invicta* and *S. geminata* in north Florida in relation to habitat and disturbance. *Ann. Entomol. Soc. Am.* 81: 76-81.
- TSCHINKEL, W. R. 1993. The fire ant (*Solenopsis invicta*): still unvanquished, pp. 121-136 *In* B. N. McKnight [ed.], *Biological Pollution: The Control and Impact of Invasive Exotic Species*. Indiana Acad. Sci., Indianapolis, IN.
- WETTERER, J. K., AND J. A. MOORE. 2005. Red imported fire ants (Hymenoptera: Formicidae) at gopher tortoise (Testudines: Testudinidae) burrows. *Florida Entomol.* 88: 349-354.