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THE RED IMPORTED FIRE ANT, *SOLENOPSIS INVICTA*,
IN THE VIRGIN ISLANDS (HYMENOPTERA: FORMICIDAE)JAMES K. WETTERER¹ AND ROY R. SNELLING²¹Wilkes Honors College, Florida Atlantic University, 5353 Parkside Dr., Jupiter, FL 33458²Natural 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.

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