



RESEARCH ARTICLE - ANTS

New-World Spread of the Old-World Robust Crazy Ant, *Nylanderia bourbonica* (Forel) (Hymenoptera: Formicidae)

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Abstract

The robust crazy ant, *Nylanderia bourbonica* (Forel) (formerly *Paratrechina bourbonica*), is native to the Old-World tropics and subtropics. Its earliest known record in the New World was collected in 1924 in Miami, Florida. Here, I examine the subsequent spread of this species to other parts of North America and the West Indies. I compiled published and unpublished New World *N. bourbonica* specimen records from 446 sites, documenting the earliest known records for 24 geographic areas (countries, island groups, major islands, and US states), including nine for which I found no previously published records: Anguilla, Antigua, Barbuda, British Virgin Islands, Jamaica, Turks and Caicos Islands, Missouri, New York, and Washington. The vast majority of New World site records for *N. bourbonica* (89%) come from Florida, where this species is now known from 37 counties. Most, if not all, of the 14 site records of *N. bourbonica* in North American north of 30.5°N come from indoors. Although the earliest record of *N. bourbonica* from Cuba dates to 1933, the spread of *N. bourbonica* to many West Indian islands appears to be much more recent. In Florida, *N. bourbonica* is a widespread, though relatively minor household and agricultural pest, and also is common in some more natural environments. It remains to be seen whether *N. bourbonica* will become a significant pest in the West Indies or elsewhere in the New World.

Introduction

Forel (1911) listed 15 tramp ant species, spread by human commerce, which had achieved or were in the process of achieving broad cosmopolitan distributions. Over the past 100 years, many additional ant species, not on Forel's (1911) original list, have attained broad distributions in both the Old World and New World (Wetterer, 2015). Here, I examine the geographic distribution of one of these new cosmopolitan species, *Nylanderia bourbonica* (Forel) (formerly *Paratrechina bourbonica*). This species, native to the Old-World tropics and subtropics, is now spreading through parts of North America and the West Indies.

In 1924, Alexander E. Wight collected the earliest known *N. bourbonica* specimens in the New World in Miami, Florida (Wheeler, 1932). Smith (1930) reported that *N. bourbonica* "workers were observed running over sand and the pavement of sidewalks at Miami. It would appear that this species is not only well established at Miami but that it is capable of living outdoors. Whether the species will prove to be a house infesting form is not known, but it would appear that there might be a strong possibility." *Nylanderia bourbonica* has since become a common household and agricultural pest throughout much of peninsular Florida (Klotz et al., 1995). Trager (1984) reported that *N. bourbonica* was "established outdoors in the US in peninsular Florida from Gainesville



south. I have also seen specimens from Mobile, Alabama which were probably collected outdoors”. In addition to Florida and Alabama, Trager (1984) plotted *N. bourbonica* site records from Kansas, South Carolina, Texas, Cuba, and Mexico on a distribution map.

Taxonomy

Nylanderia bourbonica is a large (total length = 2.6-3.2mm; Trager, 1984), uniformly dark species, with thick straight hair on the mesosoma. Forel (1886) described *Prenolepis nodifera bourbonica* (= *N. bourbonica*) from Réunion, an island in the Indian Ocean. Some published records of *N. bourbonica* from the Old World appear to be misidentifications of *Nylanderia vaga* (Forel), *Nylanderia amia* (Forel), and possibly other *Nylanderia* species (Williams et al., 2020). In the New World, however, *N. bourbonica* is easy to distinguish from all other species (see Deyrup, 2016), and published *N. bourbonica* specimen records appear to be correctly identified (J.S. LaPolla, pers. comm.).

The genus is named in honor of William Nylander (1822-1899), a Finnish naturalist. The species is named after Île Bourbon (now Réunion island), where the type specimens were collected. One common name for *N. bourbonica* is the robust crazy ant. Robust refers to its relatively large and “husky” size compared to other species in the genus; crazy refers to the fast, erratic movements typical of *Nylanderia* species.

Materials and Methods

Using published and unpublished records, I documented the worldwide range of *N. bourbonica*. I obtained unpublished site records from museum specimens in the collections of Archbold Biological Station (ABS; identified by M.A. Deyrup), the Museum of Comparative Zoology (MCZ; identified by S.P. Cover) and the US National Museum of Natural History (USNM; identified by J.S. LaPolla). In addition, I obtained unpublished site records from on-line databases by Antweb (antweb.org) and iDigBio (idigbio.org), which included collection information for *N. bourbonica* specimens in the Mississippi Entomological Museum (MEM), Texas A & M University (TAMU), and J.T. Longino’s personal collection (JTLC). I received unpublished records from J.A. MacGown, J.C. Trager, and S.D. Porter. I also included site records of *N. bourbonica* based on photographs posted on iNaturalist from Grand Cayman (2), New York (1), and Florida (15).

Starting in 2000, I collected *N. bourbonica* at numerous sites as part of various ant surveys in the West Indies and Florida (e.g., Wetterer and O’Hara, 2002; Wetterer et al., 2007; Wetterer & Lombard, 2010). In 2018-2021, I made ant surveys at several hundred sites in peninsular Florida primarily to map out the spread of non-native ants, including *Anochetus mayri* Emery (Wetterer et al., 2018), *Camponotus novogranadensis* Mayr (Wetterer, 2019), *Camponotus sexguttatus*

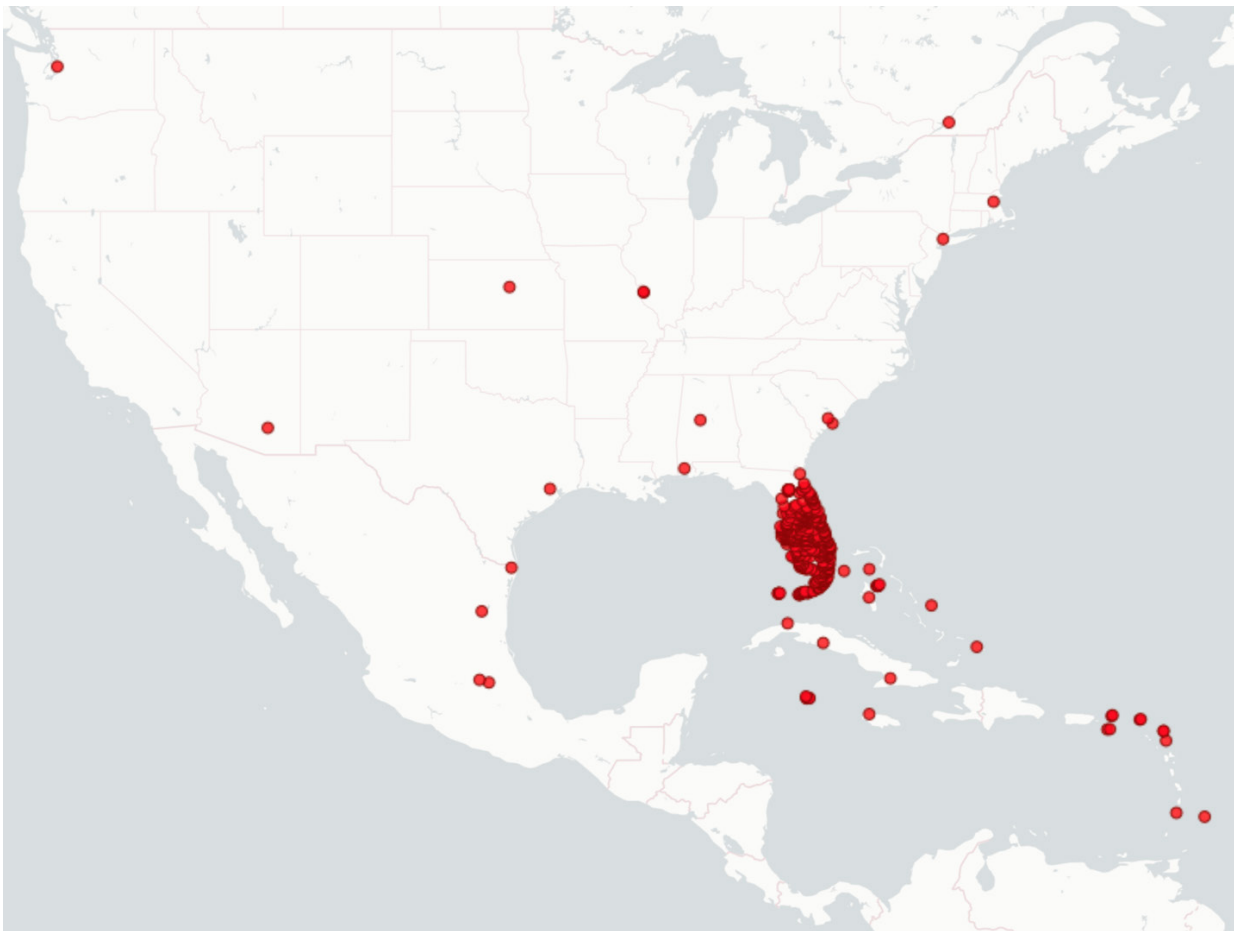


Fig 1. New World site records of *Nylanderia bourbonica* (mapped using carto.com).

(Fabricius) (Wetterer, 2020a), *Camponotus planatus* Roger (Wetterer, 2020b), *Odontomachus ruginodis* Smith (Wetterer, 2020c), *Sylophopsis sechellensis* (Emery) (Wetterer, 2020d), and *Sylophopsis subcoeca* (Emery) (Wetterer & Sharaf, 2021). I collected ants primarily through vegetation beating and leaf-litter extractions, mostly in weedy areas along roads, hiking paths, and adjacent to commercial parking lots. I deposited voucher specimens at the MCZ and USNM.

Geographic coordinates for collection sites came from published references, specimen labels, maps, or geography web sites (e.g., earth.google.com, www.tageo.com, and www.fallingrain.com). If a site record listed a geographic region rather than a “point locale,” and I had no other record for this region, I used the coordinates of the largest town within the region or, in the case of small islands and natural areas, the center of the region. I mapped site records using carto.com.

Results

I compiled published and unpublished New World *N. bourbonica* specimen records from 446 sites (including 396 sites in Florida; Fig 1), documenting the earliest known records for 24 geographic areas (countries, island groups, major islands, and US states), including nine for which I found no previously published records: Anguilla, Antigua, Barbuda, British Virgin Islands, Jamaica, Turks and Caicos Islands, Missouri, and Washington (Table 1).

I compiled *N. bourbonica* from 32 sites on 16 West Indian islands, including published records from Barbados (Wetterer et al., 2016), New Providence (Deyrup et al., 1998), South Bimini (Smith, 1954), North Andros (Deyrup et al., 1998), San Salvador (Deyrup et al., 1998), Cuba (Trager, 1984; LoddovEga et al., 2001), and St Croix (Wetterer & Lombard, 2010). Of these, I collected *N. bourbonica* at 21 sites on eleven West Indian islands (°N, °W; date):

Anguilla, Katouche Valley, lower forest (18.217, -63.075; 29-May-2006)

Anguilla, Long Bay, golf course garden (18.190, -63.122; 21-May-2006)

Antigua, Long Bay, waterfront (17.099, -61.689; 12-Jul-2007)

Barbuda, Dulcina, by old hotel (17.594, -61.826; 8-Jul-2007)

Barbuda, Landing River, by wharf (17.591, -61.820; 8-Jul-2007)

Grand Cayman, 0.5 km up Mastic Trail (19.316, -81.196; 8-Mar-2008)

Grand Cayman, Breezy Castle, by building (19.302, -81.36; 9-Mar-2008)

Grand Cayman, Midland Acres, beach (19.297, -81.214; 8-Mar-2008)

Great Stirrup Key, beach (25.8215, -77.919; 24-Dec-2016)

Jamaica, Montego Bay, by Burger King (18.483, -77.930; 17-Dec-2010)

New Providence, Coral Heights, shopping plaza (24.987, -77.456; 2-Jul-2010)

New Providence, Nassau, zoo (25.073, -77.363; 5-Jul-2010)

New Providence, NW Adelaide, scrub (25.004, -77.513;

2-Jul-2010)

New Providence, S airport entrance, garden (25.027, -77.454; 2-Jul-2010)

New Providence, W Adelaide, beach (25.002, -77.504; 2-Jul-2010)

New Providence, W of Carmichael, roadside (25.005, -77.433; 2-Jul-2010)

North Caicos, Sandy Point, by port (21.9377, -72.0452; 15-Jan-2016)

St Croix, Krause Lagune, boat pier (17.695, -64.7627; 5-Nov-2005)

St Croix, Sandy Point, beach (17.68, -64.90; 3-Mar-2006; Wetterer & Lombard, 2010)

St Vincent, Georgetown, waterfront (13.279, -61.117; 5-Jul-2006; Wetterer, 2021)

Tortola, Boway, waterfront (18.382, -64.672; 15-Nov-2005)

Table 1. Earliest known records for *Nylanderia bourbonica* from the New World. Unpublished specimen records include collector, museum source, and site. + = no previously published records. * = indoor populations. MCZ = Museum of Comparative Zoology. USNM = US National Museum of Natural History.

North America	Earliest record
Florida	1924 (Wheeler, 1932)
South Carolina	1932 (D.E. Read, USNM): Summerville
Texas	1933 (P.J. Darlington Jr, MCZ): Brownsville
Kansas*	1974 (J.C. Trager, pers. comm.): Salina
Alabama	≤1984 (Trager, 1984)
Mexico	≤1984 (Trager, 1984)
+Missouri*	late 1980s (J.C. Trager, pers. comm.)
Arizona*	1990 (Wetterer et al., 1999)
Massachusetts*	1994 (M. Kelley, MCZ): Cambridge
+Washington*	1998 (J.T. Longino, Antweb): Seattle Center
Québec*	≤1999 (Francoeur, 2000)
+New York*	2019 (C. Seltzer; iNaturalist): NY Botanical Garden
West Indies	Earliest record
Cuba	1933 (N.A. Weber, MCZ): Cienfuegos
Bahamas	1951 (Smith, 1954)
Barbados	1998 (Wetterer et al., 2016)
US Virgin Islands	2005 (J.K. Wetterer, MCZ): Krause Lagune, St Croix
+British Virgin Islands	2005 (J. Endeman, MCZ): Road Town, Tortola
St Vincent	2006 (Wetterer, 2021)
+Anguilla	2006 (J.K. Wetterer, MCZ): Long Bay
+Antigua	2007 (J.K. Wetterer, MCZ): Long Bay
+Barbuda	2007 (J.K. Wetterer, MCZ): Landing River
+Cayman Islands	2008 (J.K. Wetterer, USNM): Midland Acres, Grand Cayman
+Jamaica	2010 (J.K. Wetterer, USNM): Montego Bay
+Turks & Caicos Islands	2016 (J.K. Wetterer, USNM): Sandy Point, North Caicos

Outside of Florida, I found only 18 North American site records of *N. bourbonica*, including three from Mexico (Trager, 1984; Hernández-Ruiz et al., 2009; Coronado-Blanco et al., 2013) and one from Canada (Biodôme greenhouse in Montréal, Québec; 45.5°N; S. Johnson, 1999 pers. comm.; Francoeur, 2000). Of the 14 US sites outside Florida, at least nine are indoor records (from north to south):

Washington, Seattle, Seattle Center (45.5°N; 27-Dec-98; J.T. Longino; JTLC)

Massachusetts, Cambridge, apartment (42.4°N; M. Kelley, MCZ)

New York, NY Botanical Garden, conservatory (40.9°N; 12-Apr-2019; C. Seltzer; inaturalist.org/observations/22398498)

Kansas, Salina, hotel (38.8°N; JC Trager pers. comm.)

Missouri, Missouri Botanical Garden (38.6°N; J.C. Trager, pers. comm.)

Missouri, St. Louis Zoo (38.6°N; J.C. Trager pers. comm.)

Alabama, Brent, motel (32.9°N; J.A. MacGown, 6-Jun-2003; MEM)

Arizona, Biosphere 2 greenhouse (32.6°N; Wetterer et al., 1999)

Texas, Houston, Cockrell Butterfly Center (29.7°N; 2-Feb-1995; TAMU)

I do not know whether records of *N. bourbonica* from five remaining US sites are from indoors or outdoors:

South Carolina, Summerville (33.0°N; Smith, 1934)

South Carolina, Charleston (32.8°N; Smith, 1934)

Alabama, Mobile (30.7°N; Trager, 1984)

Texas, Harris Co.; Houston, (29.8°N, 30-Jun-1973; TAMU)

Texas, Brownsville (25.9°N; 1933; P.J. Darlington Jr; MCZ)

I compiled 396 *N. bourbonica* site records in Florida (including 159 of my own records), from 37 counties: Alachua, Brevard, Broward, Charlotte, Citrus, Collier, DeSoto, Duval, Flagler, Glades, Hardee, Hendry, Hernando, Highlands, Hillsborough, Indian River, Lake, Lee, Levy, Manatee, Martin, Miami-Dade, Monroe, Okeechobee, Orange, Osceola, Palm Beach, Pasco, Pinellas, Polk, Putnam, Sarasota, Seminole, St Johns, St Lucie, Sumter, and Volusia (Fig 2). Marion County is the southernmost Florida county without any *N. bourbonica* site records.

The northernmost record in Florida, collected at Florida Community College North (now called Florida State College at Jacksonville North Campus) in Jacksonville, Florida (30.4°N; 20-Apr-1991; M.A. Deyrup; ABS) was apparently collected outdoors. Between 1972 to 2017, S.D. Porter and D.P. Wojcik collected *N. bourbonica* at a total of 17 sites along transects in Gainesville, Florida (29.6°N-29.7°N; S.D. Porter; pers. comm.) using baits (Fig 2: cluster of points in North Florida).

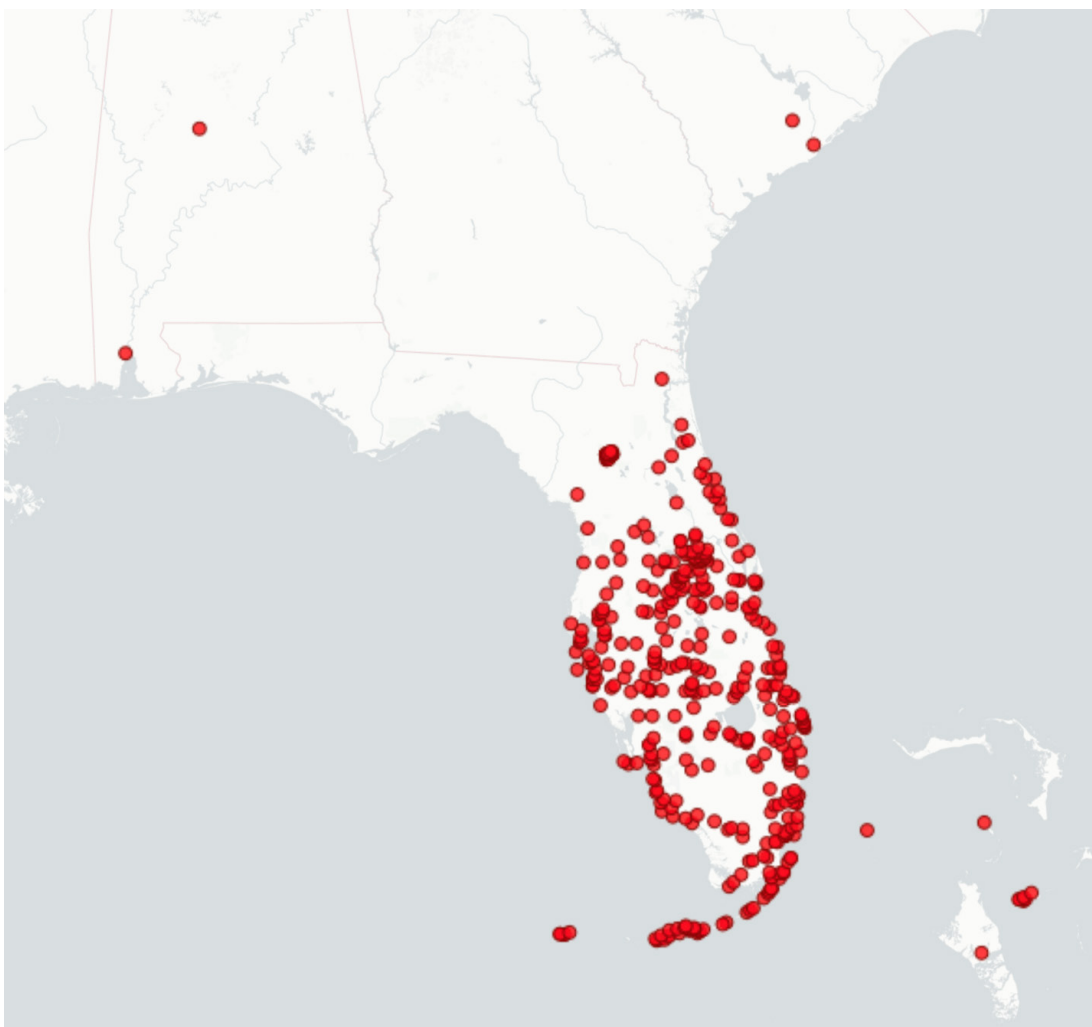


Fig 2. Site records of *Nylanderia bourbonica* in the southeastern US and the western Bahamas (mapped using carto.com).

In addition to the above records from Jacksonville and Gainesville, I recorded only seven site records of *N. bourbonica* north of 29.5°N in Florida, all of which I collected outdoors (°N, °W; date):

St Johns Co.; St. Augustine; Murabella; SR-16 & 9 Mile Rd (29.9636, -81.4906; 16-May-2020)

St. Johns Co.; Vermont Heights; by hikingtrail parking (29.804, -81.410; 21-Sep-2019)

St Johns Co.; Elkton; Church Rd (29.7839, -81.4717; 22-Apr-2020)

Putnam Co.; East Palatka; by post office (29.6453, -81.6055; 12-Jun-2020)

Alachua Co.; Gainesville; by campus museums (29.6365, -82.3697; 11-Jun-2019)

Flagler Co.; Palm Coast; Old Kings Rd (29.5558, -81.2131; 27-Mar-2020)

Putnam Co.; Rodman; Rodman Dam Rd (29.5273, -81.7547; 1-Apr-2020)

Kallal and LaPolla (2012) presented a map (Figure 205) that purported to show the distribution in North America of *N. bourbonica* and five other *Nylanderia* species. Oddly, this map included just three site records for *N. bourbonica*: one in the Florida Keys, one in Palm Beach County, Florida, and one in eastern Massachusetts. I interpret this last point as the first published record of *N. bourbonica* in Massachusetts, perhaps based on the MCZ specimen from Cambridge (see above).

Nylanderia bourbonica was once included on an on-line list of the ants of Georgia, but was removed when no voucher specimens could be found (J.A. MacGown, pers. comm.). Antweb once listed *N. bourbonica* as in Illinois, but this list has been removed. Boer (2019) listed *N. bourbonica* from Curaçao, but more recently Boer (2021a) did not include it, and Boer (2021b) wrote “*N. bourbonica* unknown from the ABC islands” (i.e., Aruba, Bonaire, and Curaçao).

Discussion

Most *N. bourbonica* site records in New World come from Florida (89%; Figs 1 and 2). Given how widespread *N. bourbonica* is in peninsular Florida, it is surprising that it has been so rarely collected elsewhere in the New World (Figs 1 and 2). Although the first record of *N. bourbonica* from Cuba was less than a decade after the earliest records in Florida, the spread of *N. bourbonica* to many other West Indian islands appears to be recent (Table 1). While this may be, in part, an artifact of limited collecting on some islands, it is striking that *N. bourbonica* has not yet been recorded on Puerto Rico and Hispaniola, where there has been much ant research in the past few decades (e.g., see Torres & Snelling, 1997; Lubertazzi, 2019).

Since 1972, when *N. bourbonica* was first collected in Gainesville (S.D. Porter, pers. comm.), there have been only four Florida records of this species north of Gainesville (>29.7°N; Fig 1; see Results). This suggests that *N. bourbonica*

populations have shown little northward spread in Florida over the past 48+ years, and that the northern most outdoor populations in Florida may be near their climatic limits in terms of cold weather. Deyrup (2016), in fact, noted that *N. bourbonica* “records from Mobile, Alabama (Trager, 1984), and from Jacksonville, Florida, might represent populations in urban sites protected from cold weather.” In the New World, there are only 12 records of *N. bourbonica* from sites north of 30.5°N, and at least nine of these were collected indoors (see results).

In Florida, *N. bourbonica* is now a widespread household and agricultural pest (Klotz et al., 1995). Wilson (1964) reported that *N. bourbonica* “workers were commonly seen foraging during the day at several locations on the streets of residential sections of Key West.” Although Vail et al. (1994) reported that *N. bourbonica* is a major structure-invading pest in South Florida, Deyrup (2016) wrote “its chief crime seems to be that of traipsing about on the patio, where it seems to be a regular but not strikingly abundant visitor.” Deyrup (2016) wrote: “In natural habitats in Florida, *bourbonica* is most often found in wet areas that are naturally disturbed, such as the edges of marshes and upper zones of beaches.” In fact, Wetterer et al. (2007) found *N. bourbonica* was the second most common ant (after *Solenopsis invicta* Buren) collected at tuna bait on sea turtle nests on beaches in Palm Beach County, Florida.

Several other *Nylanderia* species have been spread around the world through human commerce (Wetterer, 2011; Williams et al., 2020). One species, *Nylanderia fulva* (Mayr), originally from South America, has become a significant pest in parts of the southeastern US and in the West Indies, where it can have enormous, localized population explosions followed by population crashes (Wetterer et al., 2014). It remains to be seen whether *N. bourbonica* will become a significant pest in Florida, the West Indies, or elsewhere in the New World.

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