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Recent noteworthy distribution records for *Deinopis spinosa* (Marx, 1889) (Araneae: Deinopidae) in the Southeastern United States

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Abstract - The ogre-faced spider *Deinopis spinosa* is the sole representative of the family Deinopidae in the US. Museum records suggest this species is restricted to the extreme southeastern US (Alabama and Florida) and Jamaica. Through nocturnal surveys and records from naturalist-oriented internet sites, we have discovered that this species is more widely distributed in the Coastal Plain region of the southeastern US. Herein, we document new state records for Georgia, Mississippi, South Carolina, and Texas, significantly expanding the known range of the species. It is unknown whether these records represent a recent range expansion or if the spider has historically been overlooked due to its cryptic nature and habits.

The ogrefaced spiders or netcasting spiders (Family Deinopidae) are pantropical, with 1 species, *Deinopis spinosa* Marx, known from the southeastern US and Jamaica (Coddington 2017; Fig. 1). The enlarged posterior median eyes of the *D. spinosa*, which contribute to the genus' common name and lend individuals a goggle-eyed appearance, are extremely sensitive and have a very short focal length (essentially the equivalent of a fish-eye lens) (Coddington 2017). For these primarily sight-hunting species, such eyes facilitate visually based nocturnal capture of prey under low-light conditions (Stafstrom and Hebets 2016). *Deinopis spinosa* has a novel and interesting forging strategy wherein individuals, positioned upside down, hold a rectangular-shaped net made of wooly silk with their 3 front pairs of legs (Fig. 1), lunge at, and expand the net to snare passing prey (Coddington and Sobrevila 1987, Coddington et al. 2012, Stafstrom and Hebets 2016).

Published information relating to the distribution of *D. spinosa* in the US can be found in several sources. Comstock (1940:273) stated that "this rare species is known only from Florida and Alabama". Marshall and Edwards (2001) mentioned that *D. spinosa* occurs statewide in Florida. In Alabama, there are several sites known from Baldwin County, a coastal county which borders the western edge of the Florida panhandle (Folkerts 2006). Based on the aforementioned museum records for Alabama and Florida, Coddington (2017:102) described the species range in the US as "the extreme southeastern US". Publications specific to Texas (Jackman 1999), and South Carolina/North Carolina (Gaddy 2009, Gaddy and Morse 1985) did not consider *D. spinosa* as a native member of the spider fauna of these states. Similarly, we could not locate museum records or any mention in the literature of *D. spinosa* from Georgia, Louisiana, or Mississippi.

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From 2012 to 2017, we opportunistically conducted nocturnal headlamp surveys for *D. spinosa* at widely distributed sites in the Coastal Plain of the southeastern US including localities in Alabama, Georgia, Florida, Mississippi, North Carolina, South Carolina and Texas. The focus of our surveys was to document new localities (i.e., document sites outside of the currently known range) for this spider in the southeastern US. In most cases, specimens representing state records or new localities were deposited in museum collections (Appendix A). We complemented our field surveys with a search for *D. spinosa* observations catalogued on the internet sites BugGuide.net (http://bugguide.net) and iNaturalist (http://inaturalist.org) (both accessed October 2017). All BugGuide and iNaturalist observations (reported below) that we deemed as credible *D. spinosa* records were supported by photographs easily identifiable to this species.

We collected (or photographed) *D. spinosa* at 1 site in Alabama, 4 sites in Georgia, 1 site in Mississippi, 1 site in South Carolina, and 1 site in Texas (Fig. 2; Appendix A). We also found *D. spinosa* at northern Florida sites close to the Georgia state line (Columbia County, FL) and in the eastern panhandle (Liberty County, FL). We located 2 additional records from BugGuide.net and iNaturalist for Alabama, an additional record for the Florida panhandle (Okaloosa County), 1 additional record for Georgia, 1 record for Louisiana, and 3 additional records for South Carolina (Appendix A). Our collection dates spanned from 27 April to 15 September; the dates of submissions for BugGuide.net and iNaturalist records (assumed to correspond with the dates on which these observations actually occurred) spanned from 30 June to 4 November.

All of the *D. spinosa* records we compiled are from the Coastal Plain physiographic province and include 1 barrier island (Sapelo Island, GA). In an attempt to map the putative and current range of *D. spinosa* in the southeastern US, we buffered all records and credible observations for northerly states (i.e., states north of Florida) by 160 km. We extended this buffer inland to, but not beyond, the margin of the Coastal Plain (Fig. 2).

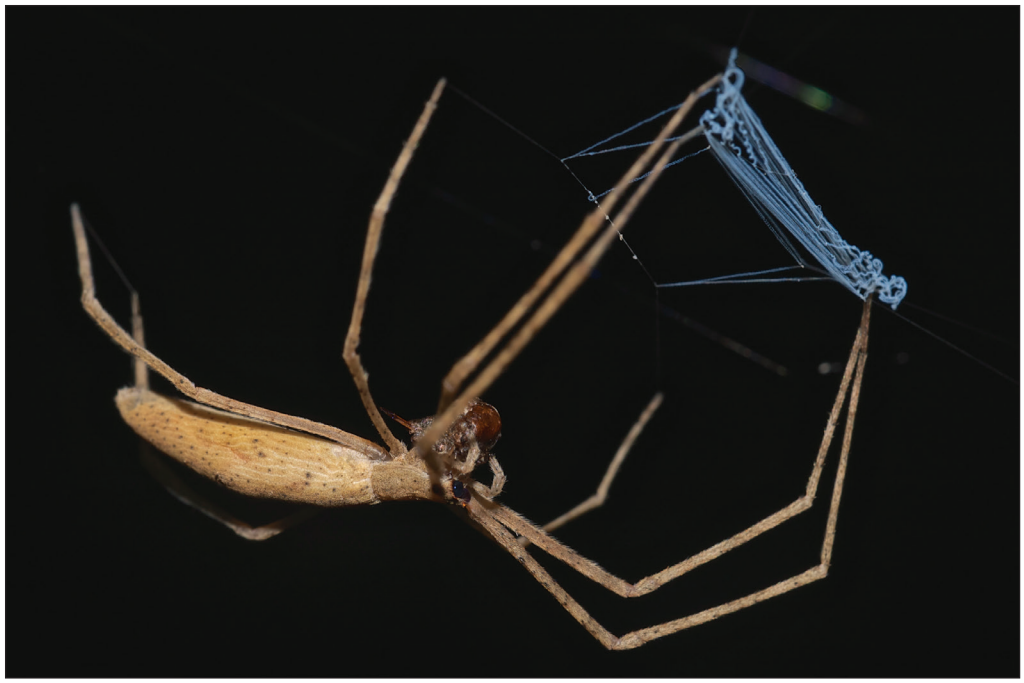

Figure 1. An adult *Deinopis spinosa*, Liberty County, FL. Photograph © Daniel D. Dye.

The *D. spinosa* records we compiled significantly expand the known range of the species in the southeastern US, and represent the first state records (supported by museum specimens) for Georgia, Mississippi, South Carolina, and Texas. In addition, we received a credible *D. spinosa* observation, in 2016, for a site in southeastern North Carolina (Fig. 2; Carolina Beach State Park, New Hanover County, NC; H. Leonard, Rougemont, NC, 2016 pers. comm.).

Deinopids are unusually rare in collections, and these spiders are seldom observed in the field (Coddington et al. 2012). Even so, *D. spinosa* may be common where it occurs (Coddington 2017). Wholly nocturnal, a behavior which likely evolved to evade predators, *D. spinosa* are inactive "stick mimics" during the daylight hours (Coddington 2017). These spiders seldom wander on the ground surface and thus are not expected in pitfall traps placed along terrestrial drift fences; for example, of 5236 spiders collected in pitfall traps at sandhill sites in north-central Florida, only a single *D. spinosa* was captured (Corey et al. 1998). We readily found 2–8 *D. spinosa* per person/hour via headlamp searches, during the spring/summer, by shining our lights on vegetation and tree trunks from 0.3–1.8 m (1−6 ft) above the ground. We found *D. spinosa* in a variety of terrestrial forested habitats including maritime hammocks, mixed *Quercus* (oak)–*Pinus* (pine) forests, and hardwood communities close to the margins of swamps. Sites in southern Alabama include coastal habitats close to brackish marshes and bay swamps (Folkerts 2006).

We are unsure if *D. spinosa* has recently expanded its range northward in the Coastal Plain accompanying climate change, as has been reported for *Nephila clavipes* L.

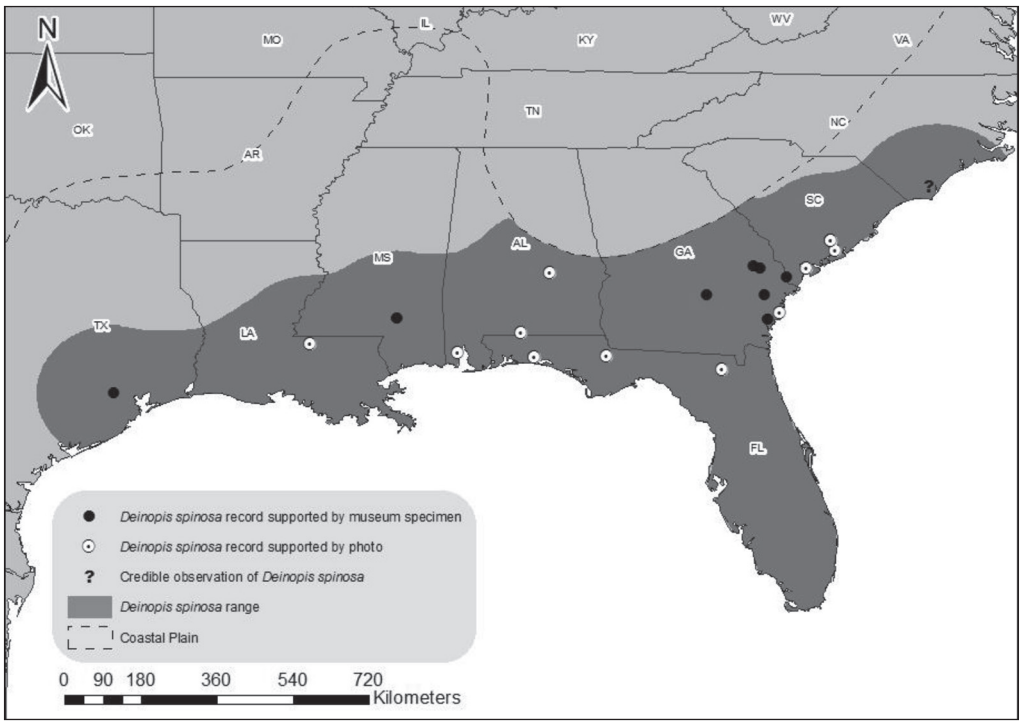

Figure 2. The range of *Deinopis spinosa* in the southeastern US. The overall range is shaded. Solid symbols represent localities supported by museum specimens, hollow symbols are observations supported by photographs, "?" is a recent credible sighting reported to the authors. Note: we have only mapped records for extreme northern Florida and for states north of Florida (*D. spinosa* occurs statewide in Florida [Marshall and Edwards 1981]).

(Golden Silk Orbweaver; Bakkegard and Davenport 2012). The number of recent records (2007–2017) for states north of Florida suggest this may be the case. However, because of its cryptic nature, as described above, *D. spinosa* is easily overlooked and thus under-reported. Also, this spider may occur in parts of the southeastern US that have not been well-sampled by arachnologists. So, whether the species has recently expanded its range or has historically been overlooked in the southeastern US may never be determined. We are not aware of any evidence suggesting that *D. spinosa*, like some arachnid taxa, has been introduced or expanded its range via transport by humans (Nedved et al. 2011).

We recommend that arachnologists, as well as natural heritage programs for states in which *D. spinosa* is now known to occur, track the occurrence of this spider. Spider biologists in Atlantic Coastal Plain states north of and contiguous with the documented range of *D. spinosa* (i.e., North Carolina, Virginia) should survey for this spider. We do not consider *D. spinosa* to be imperiled or a species of conservation concern, nor particularly habitat-specific, but wish to underscore that there are very few records for this species for states located north of Florida. Although not a model citizen-science species organism like the Golden Silk Orbweaver (Bakkegard and Davenport 2012) the advent of digital photography and citizen-science websites like BugGuide.net and i-Naturalist will continue to augment our knowledge of this spider's distribution.

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Appendix 1. Recent (2007–2017) *Deinopis spinosa* records/observations for extreme northern Florida and for states north of Florida. # = number of *Deinopis* observed (number of museum speciments).

Date	State, county	Location	Latitude/longitude (decimal degrees)	Collector(s)	Museum specimen or observation	#
16 June 2012	AL, Escambia	Conecuh National Forest	31.039266°N, 86.752166°W	D. Dye	Author's observ.; photo	1(0)
5 August 2016	AL, Mobile	Dog River	30.622421°N, 88.118228°W	R. Zimlich	www.bugguide.net	1(0)
8 July 2016	AL, Montgomery	Montgomery	32.332969°N, 86.143524°W	Anonymous	www.inaturalist.org	1(0)
15 July 2012	FL, Columbia	Osceola National Forest	30.279708°N, 82.480225°W	D. Dye	Authors observ.; photo	1(0)
21 August 2010	FL, Liberty	Torreya State Park	30.562471°N, 84.951284°W	D. Dye	Authors observ.; photo	1(0)
30 June 2011	FL, Okaloosa	Niceville	30.517450°N, 86.477035°W	O. Toness	www.bugguide.net	1(0)
2 August 2016	FL, Okaloosa	Niceville	30.517450°N, 86.477035°W	O. Toness	www.bugguide.net	1(0)
1 July 2015	GA, Bulloch	10.4 km ESE Statesboro	32.426662°N, 81.675626°W	M. Moore	Florida State Collection of Arthropods (FSCA)	2(1)
1 July 2016	GA, Bulloch	10.4 km ESE Statesboro	32.426662°N, 81.675626°W	M. Moore	FSCA	2(1)
11 August 2016	GA, Bulloch	4.6 km NW Statesboro	32.474608°N, 81.821868°W	H. Chandler	FSCA	1(1)
3 July 2016	GA, Glynn	Altama Plantation WMA	31.339426°N, 81.512912°W	M. Moore, D. Stevenson	FSCA	12(8)
6 May 2017	GA, Glynn	Altama Plantation WMA	31.339426°N, 81.512912°W	M. Moore, D. Stevenson	FSCA	12(8)
6 August 2017	GA, Liberty	Hinesville	31.850077°N, 81.573963°W	D. Stevenson	FSCA	1(1)
8 October 2011	GA, McIntosh	Sapelo Island Preserve	31.470024°N, 81.240393°W	Anonymous	www.bugguide.net	1(0)
12 July 2016	GA, Telfair	Orianne Indigo Snake Preserve	31.844328°N, 82.807779°W	M. Moore, H. Chandler	FSCA	4(4)
17 September 2015	LA, West Feliciana Parish	Feliciana Preserve	30.821023°N, 91.265205°W	T. White	www.bugguide.net	1(0)
27 April 2016	MS, Forrest	Lake Thoreau Environmental Center	31.346700°N, 89.416600°W	M. McWhorter, A. Thomas	Loyola University, New Orleans, LA	2(1)
15 September 2017	MS, Forrest	Lake Thoreau Environmental Center	31.346700°N, 89.416600°W	M. McWhorter, A. Thomas	Loyola University, New Orleans, LA	2(1)
4 November 2012	SC, Beaufort	Beaufort	32.425791°N, 80.689300°W	Anonymous	www.bugguide.net	1(0)

Date	State, county	Location	Latitude/longitude (decimal degrees)	Collector(s)	Museum specimen or observation	#
22 July 2007	SC, Charleston	West Ashley	32.805079°N, 80.063479°W	Anonymous	www.bugguide.net	1(0)
22 July 2015	SC, Dorchester	Summerville	33.013068° N, 80.172436° W	Anonymous	www.bugguide.net	3(0)
17 June 2017	SC, Dorchester	Summerville	33.013068° N, 80.172436° W	Anonymous	www.bugguide.net	3(0)
19 August 2017	SC, Dorchester	Summerville	33.013068° N, 80.172436° W	Anonymous	www.bugguide.net	3(0)
19 August 2017	SC, Jasper	4.8 km NW Whitehouse	32.238764°N, 81.110929°W	M. Moore, D. Stevenson	FSCA	2(2)
16 August 2017	TX, Harris	Houston Arboretum	29.764838°N, 95.452092°W	C. Garza	Houston Museum of Natural Science	2(1)