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AN UPDATE OF THE MOSQUITO RECORDS OF FLORIDA COUNTIES, USA

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Abstract

In the last 2 decades, many new Florida county mosquito records have been discovered. The intent of this report is to establish unpublished county records to update the known distribution of mosquito species in Florida. We report 92 new county records from 5 major sources collected during 1989–2019.

Keywords

County record; Florida; mosquito

The last major publication showing the distribution of mosquito species in every Florida county (USA) was published by Darsie and Morris (2000) in their taxonomic keys to Florida mosquitoes. The authors noted that the distribution tables (3 and 4) were mostly from unpublished records and encouraged mosquito control programs to check local county fauna and keep voucher specimens. Since 2000, many Florida county and some state records have been discovered; some have been published (Darsie et al. 2002; Darsie 2003; Darsie and Shroyer 2004; Smith et al. 2006; Shroyer et al. 2015; Blosser and Burkett-Cadena 2016, 2017; Connelly et al. 2016; Shin et al. 2016; Riles et al. 2017). The intent of this report is to establish unpublished county records and to update the known distribution of mosquito species in Florida.

Data sources for locating Florida county mosquito records were from 5 primary sources: 1) University of Florida, Institute of Food and Agricultural Sciences, Florida Medical Entomology Laboratory (FMEL) Connelly Extension Lab. Data were collected while working on various mosquito research and extension projects from 1999 to 2017. 2) Bradford County (FL) Cooperative Extension Service, *Bradford County Buzz Busters*. *Buzz Busters* was a team of volunteers from Bradford County, FL, organized to assist the county mosquito control program (<https://www.bradfordcountyfl.gov/mosquito>). Following that

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sound integrated mosquito management is based on surveillance, the volunteer team collected and identified mosquitoes on a regular basis during the mosquito season and the data were provided to the mosquito control official through the FMEL and the Bradford County Extension Service. Records from June 2006 to July 2016 from Bradford County were examined. 3) Florida Department of Agriculture and Consumer Services (FDACS). The FDACS provided funding to the University of Florida (UF), FMEL (FDACS contract no. 00094772, UF project no. 00117732), to determine baseline populations of mosquitoes in 13 interior Florida counties for 2014–15. The objective of the grant was to assist Florida counties with their mosquito surveillance for meeting Federal Emergency Management Agency requirements; many county records were established during the project. Florida Emergency Management personnel set the traps and shipped the mosquito collections to FMEL for identification. 4) University of South Florida (USF), Global Health Infectious Disease Research Program, Department of Global Health. The Centers for Disease Control and Prevention provided funding (Cooperative Agreement No. U01CK000510) to monitor winter-time eastern equine encephalitis vector activity in Walton County, FL, 2017–19. Mosquitoes were aspirated from resting boxes and identified by USF and Manatee County Mosquito Control District. 5) Florida mosquito control agency records. Florida mosquito control agencies shared current and historical mosquito surveillance data.

We examined the available data sets for each Florida county for species that had not been previously reported in tables 3 and 4 of Darsie and Morris (2000) to generate a list of potential new records. Next, we reviewed the scientific literature using the mosquito species names and Florida as keywords. If there was a published record, we removed that species from our list. For the remaining records, we checked the reported Global Positioning System coordinates for accuracy to town level. Collection notes were made to describe life stage collected, habitats, trapping method, date collected, and collector and identifier information. Ninety-two Florida county records are reported here (Tables 1 and 2).

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Table 1.

Summary of new Florida county records of mosquitoes by genus and species.

Genus	Species	County
<i>Aedes</i>	<i>atropalpus</i>	Volusia
<i>Ae.</i>	<i>canadensis canadensis</i>	Bradford
<i>Ae.</i>	<i>canadensis mathesoni</i>	Sarasota
<i>Ae.</i>	<i>dupreei</i>	Bradford, Union
<i>Ae.</i>	<i>fulvus pallens</i>	Pinellas, Union
<i>Ae.</i>	<i>hendersoni</i>	Alachua
<i>Ae.</i>	<i>infirmatus</i>	Union
<i>Ae.</i>	<i>japonicus</i>	Escambia
<i>Ae.</i>	<i>pertinax</i>	Collier, Sarasota
<i>Ae.</i>	<i>sollicitans</i>	Bradford
<i>Ae.</i>	<i>stricticus</i>	Bradford
<i>Ae.</i>	<i>tormentor</i>	Manatee
<i>Ae.</i>	<i>triseriatus</i>	Union
<i>Anopheles</i>	<i>atropos</i>	Bradford
<i>An.</i>	<i>barberi</i>	Gulf, Walton
<i>An.</i>	<i>perplexens</i>	Bay, Walton
<i>An.</i>	<i>punctipennis</i>	Manatee
<i>An.</i>	<i>walkeri</i>	Walton
<i>Culex</i>	<i>atratus</i>	Indian River
<i>Cx.</i>	<i>bahamensis</i>	Collier
<i>Cx.</i>	<i>deklarator</i>	Pinellas
<i>Cx.</i>	<i>erraticus</i>	Baker, Bradford, Calhoun, Franklin, Gilchrist, Gulf, Hamilton, Jefferson, Lafayette, Liberty, Walton
<i>Cx.</i>	<i>interrogator</i>	Bay, Collier, Volusia
<i>Cx.</i>	<i>iolambdis</i>	Charlotte, Walton
<i>Cx.</i>	<i>peccator</i>	Bay, Walton
<i>Cx.</i>	<i>pilosus</i>	Walton
<i>Cx.</i>	<i>terrians</i>	Bradford, Sarasota
<i>Culiseta</i>	<i>inornata</i>	Bradford

Genus	Species	County
<i>Mansonina</i>	<i>dyari</i>	Bay, Bradford
<i>Má.</i>	<i>titillans</i>	Bay, Bradford, Gilchrist, Jefferson, Madison
<i>Orthopodomyia</i>	<i>signifera</i>	Bay, Bradford, Charlotte, Manatee
<i>Psorophora</i>	<i>cyaneescens</i>	Brevard, Manatee, Pasco, St. Lucie
<i>Ps.</i>	<i>horrida</i>	Alachua, Bay, Walton
<i>Ps.</i>	<i>howardii</i>	Madison, Suwannee
<i>Ps.</i>	<i>mathesoni</i>	Walton
<i>Toxorhynchites</i>	<i>rutilus</i>	Bay, Liberty, Pinellas, Walton
<i>Uranotaenia</i>	<i>lowii</i>	Jefferson, Lafayette, Madison, Suwannee
<i>Ur.</i>	<i>sapphirina</i>	Jefferson, Lafayette, Madison, Suwannee
<i>Wyeomyia</i>	<i>mitchellii</i>	Alachua, Bradford, Citrus, Escambia
<i>Wy.</i>	<i>smithii</i>	Citrus
<i>Wy.</i>	<i>vanduzeei</i>	Citrus

Table 2.

Florida county mosquito collection records, 1989–2019.

County	Genus and species	Location (lat., long.)	First date collected	Collector, identifier, confirmation ¹
Alachua	<i>Aedes hendersoni</i>	Suppressed for privacy	Jan. 8, 2013	C. Holderman, C. Holderman, R. Connelly
	<i>Psephenophora horrida</i>	29.644059, -82.462052	May 18, 2018	L. Reeves, L. Reeves
Baker	<i>Wyeomyia michellii</i>	Suppressed for privacy	Jan. 8, 2015	C. Holderman, C. Holderman, R. Connelly
	<i>Culex erraticus</i>	30.283435, -82.25228	Apr. 1, 2015	EMS, C. Thomas, R. Connelly
	<i>Anopheles perplexens</i>	30.202137, -85.76133	Mar. 28, 2019	D. Hood, C. Mulla, M. Riles
	<i>Cx. interrogator</i>	30.267449, -85.97680	May 23, 2018	D. Hood, M. Riles
	<i>Cx. peccator</i>	30.141677, -85.717	Oct. 17, 2017	D. Hood, M. Riles
	<i>Mansonia dyari</i>	30.273508, -85.991363	Nov. 12, 2014	D. Hood, M. Riles
	<i>Ma. titillans</i>	30.193671, -85.836634	Mar. 17, 2016	D. Hood, M. Riles, R. Connelly
	<i>Orthopodomyia signifera</i>	30.217642, -85.851888	Apr. 27, 2016	D. Hood, M. Riles
	<i>Ps. horrida</i>	30.134264, -85.735039	Aug. 9, 2018	D. Hood, M. Riles
	<i>Toxorhynchites rutilus</i>	30.141677, -85.717023	Jun. 22, 2016	D. Hood, M. Riles
Bradford	<i>Ae. canadensis</i>	29.967404, -82.103012	Oct. 4, 2012	B. Searcy, B. Searcy, R. Connelly
	<i>Ae. dupreei</i>	30.000477, -82.133453	Jun. 17, 2012	T. Sutton, T. Sutton
	<i>Ae. sollicitans</i>	30.083152, -82.065726	May 10, 2008	B. Searcy, B. Searcy
	<i>Ae. sticticus</i>	30.031106, -82.070524	Sep. 14, 2007	W. Schirmmayer, J. Almasi, R. Connelly
	<i>An. atropos</i>	29.947888, -82.126798	Aug. 17, 2007	J. Shamlaty, J. Almasi, R. Connelly
	<i>Cx. erraticus</i>	29.944541, -82.111454	Jul. 13, 2007	W. Schirmmayer, J. Almasi, R. Connelly
	<i>Cx. territans</i>	29.894862, -82.134737	Jul. 8, 2008	W. Schirmmayer, W. Schirmmayer
	<i>Culiseta inornata</i>	30.083152, -82.065726	Oct. 12, 2007	B. Searcy, J. Almasi, R. Connelly
	<i>Ma. dyari</i>	30.007715, -82.075873	Jul. 13, 2007	W. Schirmmayer, W. Schirmmayer, R. Connelly
	<i>Ma. titillans</i>	29.967404, -82.103012	Aug. 7, 2012	J. DeValerio, B. Searcy
Brevard	<i>Or. signifera</i>	30.201564, -83.086848	Aug. 4, 2007	W. Schirmmayer, J. Almasi, R. Connelly
	<i>Wyeomyia michellii</i>	30.083152, -82.065726	Sep. 14, 2008	B. Searcy, B. Searcy
Calhoun	<i>Ps. cyanescens</i>	28.50634, -80.80188	Jul. 27, 2017	M. Buono, J. Faella, R. Connelly
	<i>Cx. erraticus</i>	30.450468, -85.182057	Apr. 1, 2017	EMS, R. Connelly
Charlotte	<i>Cx. iolambdis</i>	26.947222, -82.018056	Jun. 15, 2007	B. Carey-Kovach, B. Carey-Kovach, R. Connelly
	<i>Or. signifera</i>	26.582540, -81.532580	July 16, 2012	B. Carey-Kovach, B. Carey-Kovach, R. Connelly

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County	Genus and species	Location (lat., long.)	First date collected	Collector, identifier, confirmation ¹
Citrus	<i>Wy. mitchellii</i>	28.794284, -82.332153	Oct. 5, 2014	Citrus County MCD
	<i>Wy. smithii</i>	28.794284, -82.332153	Jul. 1, 2014	Citrus County MCD
	<i>Wy. vanduzeei</i>	28.899945, -82.645925	Oct. 1, 1989	Citrus County MCD
Collier	<i>Ae. pertinax</i>	26.17315, -81.51201	Jun. 25, 2019	J. Puente, R. Heinig
	<i>Cx. bahamensis</i>	26.11649, -81.75783	May 8, 2019	B. Healy, R. Heinig
	<i>Cx. interrogator</i>	26.35266, -81.55575	Mar. 26, 2019	M. Ward, R. Heinig
Escambia	<i>Ae. japonicus</i>	30.5456, -87.3077	Apr. 14, 2018	D. Killingsworth, D. Killingsworth, N. Burkett-Cadena
	<i>Wy. mitchellii</i>	30.5456, -87.3077	Oct. 1, 2019	D. Killingsworth, D. Killingsworth, N. Burkett-Cadena
Franklin	<i>Cx. erraticus</i>	29.773559, -84.830216	Aug. 1, 2014	EMS, C. Thomas, R. Connelly
Gilchrist	<i>Cx. erraticus</i>	29.678394, -82.924054	Apr. 1, 2015	EMS, C. Thomas, R. Connelly
	<i>Ma. titillans</i>	29.678394, -82.924054	Jun. 1, 2015	EMS, C. Thomas, R. Connelly
Gulf	<i>An. s. barberi</i>	29.684713, -85.265918	Apr. 1, 2017	B. Naylor, B. Naylor
	<i>Cx. erraticus</i>	30.267804, -85.238326	Apr. 1, 2015	EMS, C. Thomas, R. Connelly
Hamilton	<i>Cx. erraticus</i>	30.521385, -82.955163	Apr. 1, 2015	EMS, C. Thomas, R. Connelly
Indian River	<i>Cx. atratus</i>	27.586877, -80.371206	Apr. 17, 2014	E. Blosser, E. Blosser, N. Burkett-Cadena
Jefferson	<i>Cx. erraticus</i>	30.512028, -83.977	Jul. 1, 2014	EMS, C. Thomas, R. Connelly
	<i>Ma. titillans</i>	30.512028, -83.977	Jul. 1, 2014	EMS, C. Thomas, R. Connelly
	<i>Ur. lowii</i>	30.555806, -83.862	Jul. 1, 2014	EMS, C. Thomas, R. Connelly
	<i>Ur. sapphirina</i>	30.555806, -83.862	Jul. 1, 2014	EMS, C. Thomas, R. Connelly
Lafayette	<i>Cx. erraticus</i>	30.031654, -83.244547	Mar. 1, 2015	EMS, C. Thomas, R. Connelly
	<i>Ur. lowii</i>	29.931164, -83.280065	Mar. 1, 2015	EMS, C. Thomas, R. Connelly
	<i>Ur. sapphirina</i>	30.031654, -83.244547	Mar. 1, 2015	EMS, C. Thomas, R. Connelly
Liberty	<i>Cx. erraticus</i>	30.421713, -84.977232	Aug. 24, 2014	EMS, C. Thomas, R. Connelly
	<i>Tx. rutilus</i>	30.335961, -84.565202	April 1, 2014	M. Riles, M. Riles
Madison	<i>Ma. titillans</i>	30.466894, -83.62647	May 1, 2015	EMS, C. Thomas, R. Connelly
	<i>Ps. howardii</i>	30.466894, -83.62647	May 1, 2015	EMS, C. Thomas, R. Connelly
	<i>Ur. lowii</i>	30.574528, -83.700056	Jun. 1, 2015	EMS, C. Thomas, R. Connelly
	<i>Ur. sapphirina</i>	30.574528, -83.700056	Jun. 1, 2015	EMS, C. Thomas, R. Connelly
Manatee	<i>Ae. tormentor</i>	27.640815, -82.552630	Aug. 1, 2012	Manatee MCD, Manatee MCD
	<i>An. punctipennis</i>	27.603150, -82.098133	Apr. 15, 2004	Manatee MCD, Manatee MCD
	<i>Or. signifera</i>	27.488889, -82.592142	May 1, 2014	Manatee MCD, Manatee MCD

County	Genus and species	Location (lat., long.)	First date collected	Collector, identifier, confirmation ¹
	<i>Ps. cyanescens</i>	27.579073, -82.483723	Jul. 1, 2008	Manatee MCD, Manatee MCD
Pasco	<i>Ps. cyanescens</i>	28.346573, -82.363756	Aug. 31, 2016	A. Lloyd, A. Lloyd
Pinellas	<i>Ae. fulvus pallens</i>	28.058056, -82.670556	Aug. 11, 2009	J. Stuck, J. Stuck
	<i>Cx. declarator</i>	27.888554, -82.783056	Jun. 25, 2009	J. Stuck, J. Stuck, R. Connelly
	<i>Tx. rutilus</i>	27.834444, -82.671389	Feb. 12, 2010	J. Stuck, J. Stuck
Sarasota	<i>Ae. canadensis mathesoni</i>	26.987252, -82.377758	Jul. 23, 2014	W. Brennan, W. Brennan, R. Connelly
	<i>Ae. pertinax</i>	27.315317, -82.460293	Jul. 23, 2014	W. Brennan, W. Brennan, R. Connelly
	<i>Cx. territans</i>	27.365665, -82.500105	Mar. 1, 2008	W. Brennan, W. Brennan, R. Connelly
St. Lucie	<i>Ps. cyanescens</i>	27.411348, -80.497064	May 28, 2018	L. Reeves, L. Reeves
Suwannee	<i>Ma. titillans</i>	30.359278, -83.002111	Aug. 1, 2014	EMS, R. Connelly
	<i>Ps. howardii</i>	30.216667, -82.833333	Jun. 1, 2015	EMS, R. Connelly
	<i>Ur. lowii</i>	30.359278, -83.002111	Aug. 1, 2014	EMS, R. Connelly
	<i>Ur. sapphirina</i>	30.359278, -83.002111	Aug. 1, 2014	EMS, R. Connelly
Union	<i>Ae. dupreei</i>	29.928646, -82.42245	Sep. 1, 2014	EMS, C. Thomas, R. Connelly
	<i>Ae. fulvus pallens</i>	29.928646, -82.42245	Sep. 1, 2014	EMS, C. Thomas, R. Connelly
	<i>Ae. infirmatus</i>	30.027182, -82.27381	Sep. 1, 2014	EMS, C. Thomas, R. Connelly
	<i>Ae. triseriatus</i>	30.027182, -82.273817	Sep. 1, 2014	EMS, C. Thomas, R. Connelly
	<i>Ma. titillans</i>	30.027182, -82.273817	Sep. 1, 2015	EMS, C. Thomas, R. Connelly
Volusia	<i>Ur. lowii Ur. sapphirina</i>	29.928646, -82.42245	Sep. 1, 2014	EMS, C. Thomas, R. Connelly, EMS, C. Thomas, R. Connelly
	<i>Ae. atropalpus</i>	29.002075, -80.948118	Mar. 1, 2015	W. Grimm, E. Northey, R. Connelly and G. O'Meara, J. Duerr, M. Tressler, N. Burkett-Cadena
Walton	<i>An. s. barberi</i>	30.409483, -86.229650	Jul. 7, 2011	D. Gettlefinger, K. McDaniels
	<i>An. perplexens</i>	30.292323, -86.024500	Feb. 22, 2010	E. Jiorle, K. McDaniels
	<i>An. walkeri</i>	30.365000, -86.226050	Mar. 2, 2018	R. Clark, S. Ramirez
	<i>Cx. iolambdis</i>	30.513137, -86.108255	Oct. 23, 2017	D. Wallace, S. Ramirez
	<i>Cx. erraticus</i>	30.467816, -86.192442	Feb. 24, 2006	E. Cope, E. Cope
	<i>Cx. peccator</i>	30.392691, -85.541794	Jul. 29, 2009	C. Porterfield, N. Burkett-Cadena
	<i>Cx. pilosus</i>	30.3295, -86.158200	Aug. 23, 2019	R. Clark, C. Adams
	<i>Ps. horrida</i>	30.4025, -86.315833	Sep. 9, 2019	N. Pruitt, C. Adams
	<i>Ps. mathesoni</i>	30.284225, -85.8741	Jul. 29, 2009	C. Porterfield, N. Burkett-Cadena
	<i>Ma. titillans</i>	30.381266, -86.359348	Jul. 31, 2017	D. Reitenbach, P. Brabant
	<i>Tx. rutilus</i>	30.227398, -85.996132	May 12, 2016	K. McDaniels, K. McDaniels

MCD, mosquito control district.

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