SPREAD, LARVAL HABITAT, SEASONAL ABUNDANCE AND VECTOR STATUS OF CULEX CORONATOR: A NEW INVASIVE VECTOR SPECIES IN FLORIDA

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OBJECTIVES

1. Monitor eastward movement of this species.

2. Determine developmental sites and species association;

3. Establish relative prevalence and seasonal abundance; and,

4. Examine *Cx*. *coronator* for natural infections with Florida arboviruses.

METHODS

For objective #1, a weekly trapping network spanning over 700 miles, traveled twice per week, was established and continuously operated from February 25, 2008 through November 11, 2008. The network consisted of two Mosquito Magnet X traps per county. Each trap was baited with CO_2 gas delivered at 500 cc/min. The traps were set on Monday and picked up on Tuesday in the following nine counties between Panama City and Tallahassee as proposed: Bay, Calhoun, Gulf, Franklin, Wakulla, Leon, Gadsden, Jackson and Holmes. Exact trapping locations were geocoded and are presented in Table 1. These sites were established in conjunction with the local Mosquito Control Programs (MCP). In addition, we also continued to monitor *Culex coronator* in our existing network of 18 traps located in Okaloosa, Santa Rosa and N. Walton Cos. where it was first discovered in Florida (Smith et. al 2006). Geocodes for these sites can be obtained under the "GPS Site Coordinates & Names" tab in our mosquito and arbovirus surveillance database maintained at: http://pherec.org/DECS. Larval collections were conducted by deploying sentinel larval breeding sites consisting of small plastic containers filled with oak infusion water. One to several containers was placed at each adult trapping site. Larval collections at natural production sites (e.g., ditches, swales, woodland pools, containers, tree holes, etc.) were also conducted anytime *Cx. coronator* was found at any of the 36 locations. This was accomplished using a dipper and turkey baster. All larval collections were returned to our mosquito rearing facility where they were grown to the adult stage in BioQuip Mosquito Breeders®. Weekly mosquito density estimation reports were provided by email to the MCPs as a "value added task" conducted beyond the scope and objectives of the proposal. The MCPs used this data to gauge mosquito populations in the trapping areas.

Table 1. Geographic coordinates for collection sites in eastern Panhandle.

County	Location	Latitude	Logitude
Bay	Lynn Haven	30°14'0.36" N	85°36'57.20" W
Bay	Hwy 20 & 231	30°26'6.32" N	85°25'41.82" W
Calhoun	Carr Elem. School	30°27'1.48" N	85°10'55.71" W
Calhoun	Kinard	30°16'3.76" N	85°14'23.83" W
Gulf	Dalkeith	30°03'5.86" N	85°09'25.84" W
Gulf	Port St. Joe	29°45'50.05" N	85°17'45.42" W
Franklin	Apalachicola	29°44'2.79" N	85°17'0.81" W
Franklin	Carrabelle	29°51'18.89" N	84°40'35.61" W
Wakulla	Sopchoppy	30°34'1.70" N	84°29'12.24" W
Wakulla	Ivan	30°13'33.31" N	84°21'46.85" W
Leon	Sprinil Road	30°23'59.50" N	84°18'33.55" W
Leon	Baragonas Road	30°29'46.26" N	84°21'52.12" W
Gadsden	IFAS Quincy Farm	30°35'5.11" N	84°35'36.29" W
Gadsden	Berner Lake	30°34'47.34" N	84°41'50.73" W
Jackson	Grand Ridge	30°40'10.94" N	85°22'0.37" W
Jackson	Marianna (IFAS Ext. Service)	30°45'54.67" N	85°15'21.34" W
Holmes	Bonifay	40°45'13.15" N	85°39'59.54" W
Holmes	Ponce DeLeon State Park	30°43'22.30" N	85°55'52.79" W

Developmental sites and species associations described in Objective #2 were kept in journal records for each of our *Cx. coronator* collections. All of our records came from adult collections, since we were unable to locate any natural breeding larvae.

Objective #3 was established by simply tabulating the positive collections and dates. There were so few *Cx. coronator* collected that plotting numbers was not practical.

We had anticipated collecting many more specimens so that it would be feasible to test them for evidence of arbovirus infections as indicated in Objective #4. Unfortunately, we did not collect enough for one pool. Also, most all of the specimens collected were dead, consequently greatly reducing the likelihood of isolating virus.

RESULTS

Within the new surveillance region between Panama City and Leon Cos., *Cx. coronator* was recovered for the first time in Holmes Co. just south of Bonifay at the county recycling center located adjacent to the state prison. This site contained numerous, man-made water-holding containers such as tires and white goods. We also collected it for the first time at St. Andrews State Park in Bay Co. near a scrub habitat located adjacent to a marsh dominated by buttonwood. Just prior to the start of our surveillance activities, Mr. Thomas Loyless, retired FDACS Bureau of Entomology & Pest Control, reported collecting it near his home in northern Leon Co. Also, Dr. Peter Jiang, FDACS

Bureau of Entomology & Pest Control reported collecting it near the FDACS office in downtown Tallahassee and in rural Gadsden Co. near Quincy. These were the first and only collections of this species in these counties. All other counties in the new surveillance network were negative. Incidentally, *Cx. coronator* was recovered at the following cities in our original surveillance area in the western panhandle during 2008: Valparaiso, Holt, Milton, and Jay. All of our collections since the original discovery of *Cx. coronator* in 2005 are reported in Table 2. Collections highlighted in red were made possible by this grant.

County	City	Year	Trap Date	# *Cx. coronator*
N. Walton	Gaskin	2005	10/5	2
	New Harmony	2006	9/6	1
Okaloosa	Mary Ester	2006	1/17	1
			8/22	1
			11/7	5
		2007	1/16	1
	Destin	2005	11/29	2
		2006	9/12	3
			11/15	3
	Holt	2005	10/4	1
		2006	10/3	1
		2007	7/25	1
		2008	10/1	1
	Milligan	2005	9/27	1
			11/8	1
			11/29	2
		2006	7/25	1
			12/18	1
		2007	8/7	1
	Crestview	2005	8/23	1
			10/4	1
		2006	1/17	2
			1/24	1
			3/29	1
			8/8	1
			8/15	3
			8/22	1
			8/29	1
			9/12	1
		2007	9/18	2
	Valpariso	2005	10/4	2
			11/29	6
		2007	9/18	4
		2008	9/3	2
			9/16	1
			10/7	1
Santa Rosa	Jay	2008	11/4	5
	Between Allentown &	2006	9/6	2

	Berrydale on Hwy 178		9/19	1
	Milton	2006	8/8	1
		2007	8/7	1
		2008	9/23	1
	Roeville	2006	9/19	1
	Gulf Breeze	2005	10/18	2
			11/1	1
			11/8	1
			11/29	8
		2006	1/24	2
			7/25	1
			9/19	4
			11/15	2
		2007	8/7	1
			9/25	1
	Navarre	2005	8/23	1
		2006	9/19	1
			10/3	1
			10/17	1
			11/15	1
		2007	8/7	1
Washington	Caryville	2005	10/20	1
	Chipley	2005	9/28	1
	Ebro	2006	11/1	1
	Sunny Hills	2006	11/1	1
	Vernon	2006	9/20	1
			10/11	1
			11/1	2
		2007	8/22	2
Holmes	Bonifay	2008	10/13	1
Bay	Panama City Beach	2008	7/14	1
Grand Total				112

In reviewing these data, it was apparent that *Cx. coronator* was most prevalent between August and November. In fact, we seldom collected this species between spring and mid-summer. Species associated with *Cx. coronator* were as follows: At the Holmes Co. site — *Anopheles punctipennis*, *Coquilletidia perturbans*, *Culex erraticus*, *Aedes infirmatus*, *Aedes vexans*, *Culex nigripalpus*, and *Culex salinarius*. At the Bay Co. site – *Anopheles crucians* and *Culex erraticus*. These are similar species found in association with earlier *Cx. coronator* collections made in the western panhandle. None of our larval collections yielded any *Cx. coronator*. All sentinel larval breeding sites contained *Aedes albopictus*.

CONCLUSIONS

At this point, it appears *Cx. coronator* is widely distributed, but seldom found in large numbers. Very few of our collections have yielded more than a half dozen specimens. Most of the time, we found only 1 or 2 among a large number of more prevalent species. Until the time this species becomes more

abundant, it does not appear likely that it poses much of a threat to Florida. That said, however, it is prudent to continue monitoring it spread throughout the State.

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LITERATURE CITED

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