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Short Communication

First Record of Culex (Culex) Coronator (Diptera: Culicidae) in Havana, Cuba

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Abstract

Culex (Culex) coronator Dyar and Knab was recorded in three of the 15 municipalities surveyed in Havana province, Cuba. Cx.coronator larvae were found in six different types of breeding sites. At these breeding sites, this mosquito was associated with other species such as Culexnigripalpus, Theobald and Anopheles albimanus, Wiedemann. This represents the first record of Cx. coronator in the Havana province.

Introduction

Culex coronator is a neotropical mosquito species described by [1] in Trinidad. Its habitat extended from United State to South America (Mexico, Belize, Guatemala, Honduras, Nicaragua, Costa Rica, El Salvador Panama, Argentina,Colombia,Bolivia, Brazil, French Guiana, Paraguay, Peru, Suriname,Venezuela,and in the Caribbean region in Trinidad and Tobago) [2-3]. In United States, this species is considered an invasive species that had dispersed eastward [2-6]. Cx.coronator breeds in a large range of larval habitats that vary from natural to artificial containers, temporary ground pools, under complete and partial shade or full sun, in sylvatic, rural and urban environments [7]. In Brazil, it was found in anthropic environments [8].

The Cx.coronator complex has a confuse taxonomy history that includesseveral species. Recent evidence from the morphological and molecular data concludes, (at least provisionally), that the Cx. coronator complex is a single polymorphic species [9].

Cx.coronator has been documented in a number of temperate areas in the United States. Since 2002 specimens have been reported in different geographic areas such as, Oklahoma, Louisiana, Mississippi, Alabama, and Florida. These records extend the known distribution of Cx. coronator from six other states (Arizona, Louisiana, Mississippi, New Mexico, and Texas). In 2007, adult specimen's of Cx.coronator were collected in Chatham County, Georgia, and Jasper County, South Carolina, during disease vector monitoring efforts [10]. This represents the first Atlantic coast record of this species in Georgia and the first confirmed record of Cx. coronator in South Carolina. Subsequently a single adult female of Cx. coronator was collected on November 1, 2016, in Suffolk, Virginia, in a BG-Sentinel 2® trap during routine mosquito surveillance. This was the first documented observation of this species in the state of Virginia and the first time it has been found this far north in the United States [11]. The distribution of Cx. coronator in the United State seems to be expanding at a prodigious rate, for reasons that remain unclear at first. Because Cx. coronator was not included in the taxonomic keys of Florida mosquitoes [12], it is possible that it was present in Florida prior to the first report in 2005 [5] and that the mosquito was present in the counties reported here prior to the year that the first confirmed collections and identification of this species were made. Several factors that may have facilitated the spread and establishment of this mosquito in Florida were discussed recently [13].

Although Cx. coronator is not usually considered to be a species of major health importance, several pathogens have been isolated from field-collected females. Venezuelan equine encephalitis virus samples from Mexico [14-15] and St. Louis encephalitis virus samples have been isolated from females of Cx. coronatorin Trinidad [16]. Studies on West Nile virus in United States found this mosquito naturally infected [17] while another study demonstratedits high susceptibility to this virus in laboratory conditions between 80-100% and similar or higher transmission rates than Culexpipiens, Culex. quinquefasciatusand Culex. Restuans [18].

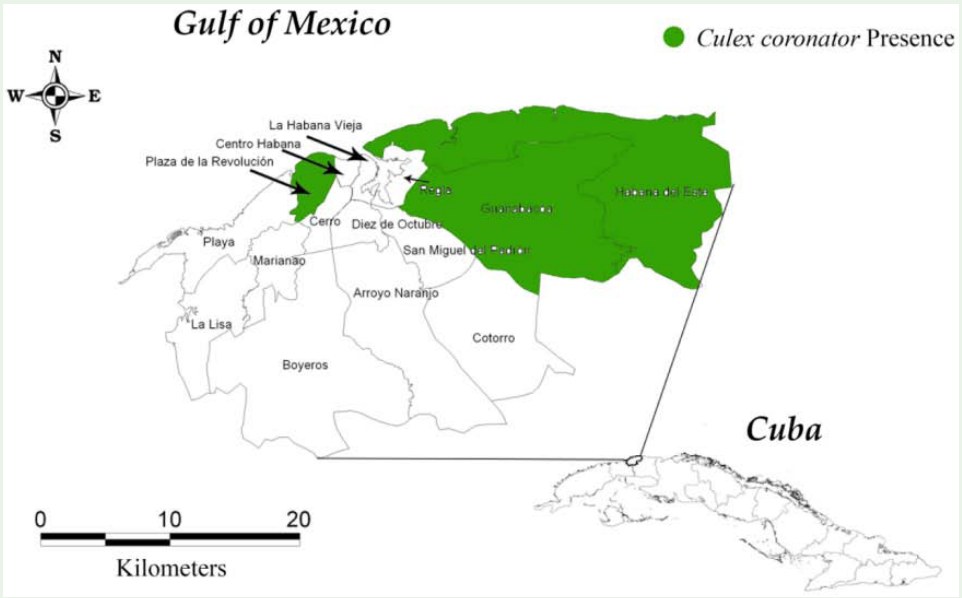

Figure 1: Municipalities with *Culex coronator* presence in Havana, Cuba, 2014-2018.

In 1981, the eradication campaign of Aedesaegypti was established in Cuba, later this campaign received the name of National Control Program of Ae.aegypti and Aedesalbopictus. In both, the identification of mosquito larvae and adults routinely collected is carried out by the personnel belonging to entomology laboratory at municipality and provincial level in whole country. In 1995 was reported Ae.albopictus in Cuba by this program [19].

The aim of this paper is to report the presence and distribution of Cx coronator in Havana, Cuba and to identify its breeding sites and association with other mosquito species.

Methodology

Havana is located at 23°07′00″N 82°23′00″W of Cuba. The finding occurred during the sampling was carried outas part of routine mosquito monitoring conducted by the national control program established in the country in each 15 municipalitiesin the Havana province. The containers and natural breeding sites present in houses, courtyards and surrounding houses were inspected for the presence of mosquito larvae monthly in all municipalities from January 2014 to June 2018. The work was performed by trained vector control personnel from the national vector control program in each municipality. The larval mosquito samples were collected using a 3mL plastic pipette and placed in vials with 70% alcohol. The vials were labeled with the date, sample collection site, and container type. A key for the mosquito was used to identify the samples [20] in the provincial entomology laboratory and quality control of thisprocess was carried out in the Vector Control Department in the Institute of Tropical Medicine Pedro Kourí.

Results and Discussion

Cx coronator wasfound in three (20%) of the 15 surveyed municipalities (the first register was in Habana del Este in 2014 following by Guanabacoa in 2016 and Plaza de la Revolución in 2017) (Figure 1). This mosquito was collected from water storage tanks, cans, cement pots, hole in ground and bucket associated with An.albimanus and Cx.nigripalpus (Table 1). This represents the first record of Cx coronator in Havana province and in Cuba.

Table 1: General information on *Cx. coronator* reported in three municipalities in Havana province, Cuba, 2014-2018.

Collected Date	Municipality	Locality	Breeding site type	Mosquito species associated
23/07/2014	Habana del Este	Guanabo	cans	4 Larvae of *Cx. coronator* 2 Larvaeof Cx. *nigripalpus*
2/11/2016	Guanabacoa	Santa María del Rosario	drain	4 Larvae of Cx. *coronator* *4 Larvae of An. albimanus*
15/02/2017	Plaza de la Revolución	Parque Zoológico de La Habana	Cementpots	2 Larvae of Cx. *coronator* 4 Larvae of *An. albimanus*
26/06/2018	Guanabacoa	Santa María del Rosario	Hole in ground	6 Larvae of *Cx. coronator*
26/06/2018	Guanabacoa	Santa María del Rosario	cans	3 Larvae of *Cx. coronator*
4/7/2018	Guanabacoa	Santa María del Rosario	Water storage tanks	4 Larvae of *Cx. coronator* 2 Larvae of *Cx. nigripalpus*
19/07/2018	Guanabacoa	Santa María del Rosario	Bucket	3 Larvae of *Cx. coronator*
19/07/2018	Guanabacoa	Santa María del Rosario	Water storage tanks	5 Larvae of *Cx. coronator*
				3 Larvae of *Cx. coronator*

According to the distribution of this species in the American continent, mainly from the United States to Patagonia, it is difficult to identify the factors that could facilitate the occurrence of Cx coronator in Cuba. The authors believe that the species may have been introduced throughadult forms aboard maritime transports (cruises or others) or aboard airplanes from of the continental distribution area of the mosquito. Although the possibility remains that Cx. Coronator was present in the country before and that because of the small amount of taxonomic sampling on the fauna of Cuban culicids, researchers did not detectit until now. In another hand Cx. coronator was not included in the taxonomic keys of Cuba mosquitoes.

Study Limitations

The larval samples received at the provincial reference laboratory from other mosquito species other than Aedesaegypti and Aedesalbopictus only account for 10% of what is collected during the routine monitoring of the Program, which influences the number of samples, frequency of appearance and number of larvae of Cx. coronator identified until now.

No adult specimens were obtained from the locations where the larval presence of the mosquito was recorded. However, the provincial government program plans to collect more specimens including Cx. coronator in the adult phase, as well as, of other associated species in future studies in the mentioned locations in Havana province, Cuba.

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