



Bluetongue virus in South America, Central America and the Caribbean



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ABSTRACT

Bluetongue virus (BTV) has been detected in many parts of the world but the data available from each continent are substantially different. Some regions are not covered by proper surveillance programs and thus, the real situation concerning the incidence of BTV in those regions is unknown. This is the case of Central America, South America and the Caribbean, where few outdated data about the presence and spread of BTV have been reported. In the present review, we update the BTV situation in those regions by compiling the serologic data available and analyzing the genetic information reported by the different research groups which are studying the disease in the region.

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1. Introduction

Information about bluetongue virus (BTV) in the American continent, especially Central America, the Caribbean and South America is limited. Many of the BTV surveillance programs have not been done systematically and the resultant publications have reported few data which do not allow a full understanding of the presence and circulation of the virus in the region. However, the serologic data reported by some groups allow updating the information about the virus.

In this review, the recent published serologic and genetic information is reviewed to better understand the epidemiology of BTV in the Caribbean and South and Central America.

The traditional idea claims that BTV spread is limited to latitudes 35°S and 40°N or 50°N (Coetzee et al., 2012), i.e. almost all the American continent. Latitude 35°S reaches the middle of Argentina and nearly all the Pampas region, where the main cattle production is carried out, whereas latitude 50°N reaches the south of Canada. Nowadays, it is empirically known that BTV is widely spread between those limits, an idea supported mainly by serologic evidence (Legisa et al., 2013). In North America, BTV was first described in 1948 (Coetzee et al., 2012). Since then, several reports have shown widespread BTV circulation and putative incursions from the Caribbean Basin and Central America, especially to the south east of the USA (MacLachlan et al., 2013). Wilson (Mertens et al., 2009) and Lager (Lager, 2004) have previously reviewed the

virus presence in the continent but due to the global epidemiology features of the virus, an update is needed. In this review, we summarize some of the data previously compiled and enlarge the information both with new bibliography and with own genetic analysis of BTV in the Caribbean and Central and South America.

2. BTV in Central America and the Caribbean

In Central America and the Caribbean, and even in the Lesser Antilles, BTV is widespread (Greiner et al., 1993; Martinez et al., 2011; MacLachlan et al., 2007). This region seems to be a source of BTV for the rest of the continent with neither ecologic nor geographic barriers described to geographically isolate central America from North or South America (Mertens et al., 2009). In fact, it has been reported that not even the sea can prevent the virus from spreading from the Caribbean islands to the American mainland (Thompson et al., 1992).

Most of the information available for this region is due to the efforts of the Regional Bluetongue team which started to work in the early 1980s (Greiner et al., 1992, 1993; Thompson et al., 1992) studying the disease over eleven countries in the region. The Bluetongue Regional team and the Interamerican Bluetongue team (Gibbs et al., 1992; Mo et al., 1994) performed a large surveillance over eleven countries in the region. Their findings included serologic detections and virus isolations (Walton and Osburn, 1992). From the early 1980s to the early 1990s, BTV was detected in Guatemala, El Salvador, Honduras, Costa Rica, Nicaragua, Panamá, Trinidad and Tobago, Barbados, Puerto Rico, Jamaica, French Martinique Island, French Guadeloupe Island and Dominican Republic (MacLachlan et al., 2007; Mo et al., 1994; Walton and Osburn, 1992). In this region, serotypes 1, 3, 4, 6, 8, 11, 12, 14 and 17 were detected by serotype specific antibodies and serotypes 1, 3, 4, 6,

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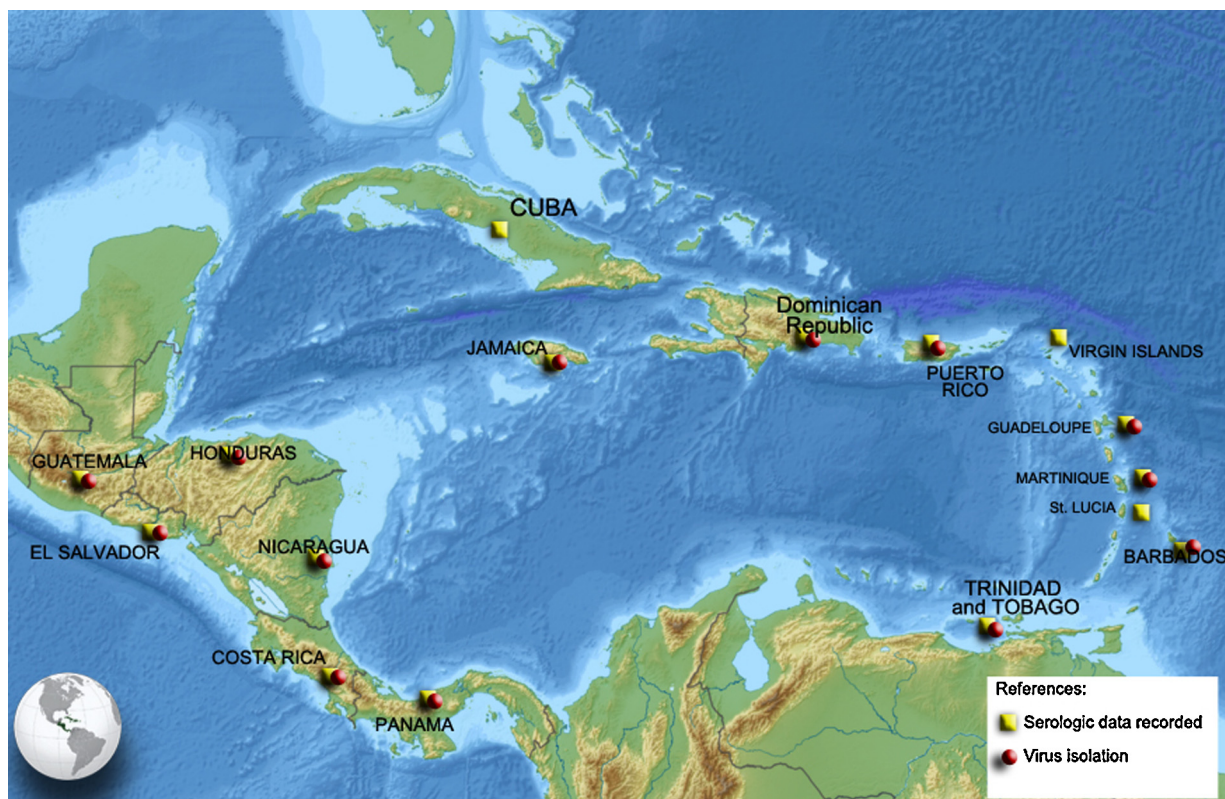


Fig. 1. Map of Central America and the Caribbean Basin showing locations for bluetongue virus (BTV) surveillances and areas where the virus was isolated. Yellow squares indicate serologic data recorded and red dots indicate area where the virus was isolated.

8, 12 and 17 by virus isolation (Mo et al., 1994; Gibbs et al., 1992, 1983; Greiner et al., 1989, 1993; Gumm et al., 1984; Homan et al., 1990). In 1981, Metcalf et al. (1981) detected almost 80% of prevalence in Puerto Rico and Virgin Islands. In the 1980s, Gibbs et al. (1983) described an overall seroprevalence of 70% in cattle, 67% in sheep and 76% in goats, detected by Agar Gel Immuno-Diffusion (AGID). These authors also described high prevalence percentages in Jamaica (77%), Antigua (76%), St Lucia (82%), Barbados (61%), Grenada (88%) and Trinidad and Tobago (79%). In 1992, Mo et al. (1994) evaluated and detected BTV in the region, and stated that

some of the serotypes previously detected were still circulating. In Cuba, a country never sampled by the Regional teams, the only report about the situation of BTV was made by Martinez et al. (2011), who found a seropositivity of 99.7% in 1100 animals sampled (Fig. 1 and Table 1).

Regarding the vector species suspected to be responsible for BTV transmission among ruminants, Walton and Osburn (1992), Greiner et al. (1990) and Mo et al. (1994) isolated BTV from *Culicoides insignis*, *C. flierifer* and *C. pusillus*. Additionally, they suggested that these three species, mainly *C. insignis*, were the primary

Table 1
Serotypes determined by isolation or serologic techniques in South America, Central America and the Caribbean.

Country	Virus isolation	Serotype determination	References
Central America and the Caribbean			
Guatemala	1, 3, 6, 17	1, 3, 6, 11, 14	Thompson et al. (1992)
El Salvador	1, 3, 6	1, 6	Thompson et al. (1992)
Honduras	1, 3, 6, 17	1, 3, 6, 17	Thompson et al. (1992)
Nicaragua	1, 3, 6	1, 3, 6	Thompson et al. (1992)
Costa Rica	3, 6, 12, 14, 17	1, 3, 6	Homan et al. (1985a), Thompson et al. (1992)
Panama	3, 6	3, 6	Thompson et al. (1992)
Trinidad and Tobago	3	1, 3, 4, 6, 8, 12, 17	Thompson et al. (1992)
Barbados	1, 3	1, 3, 4, 8, 12, 17	Thompson et al. (1992)
Puerto Rico	4, 17	3, 4, 6, 8, 17	Thompson et al. (1992)
Dominican Republic	4, 6, 8	3, 4, 6, 8, 17	Thompson et al. (1992)
Jamaica	3, 12	3, 12	Thompson et al. (1992)
Martinique	2, 10, 11, 13, 17, 18, 22, 24		MacLachlan et al. (2007)
Guadeloupe	5, 17		GenBank
Southamerica			
Colombia		12, 14, 17	Homan et al. (1985a)
Guyana	1, 2, 6, 10, 12, 13, 17, 24		GenBank
Brazil*	4, 12	4, 12	Clavijo et al. (2012), Grocock and Campbell (1982) and Martins et al. (2011)
Argentina	4	4	Legisa et al. (2013)

*Grocock and Campbell (1980) isolated BTV4 from zebu cattle from Brazil that had been admitted into quarantine in Florida.

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